THE ARCHITECTURAL FORUM

JULY

1921

Single Copy Sixty Cents ROGERS AND MANSON CO., PUBLISHERS Six Dollars the Year

THE ARCHITECTURAL FORUM

AN ILLUSTRATED ARCHITECTURAL MONTHLY DEVOTED TO THE ART, SCIENCE AND BUSINESS OF BUILDING

ROGERS AND MANSON COMPANY, Publishers

NEW YORK BOSTON CHICAGO

INDEX TO VOLUME XXXV JULY TO DECEMBER INCLUSIVE, 1921

Index to Illustrations According to Subject

Key to Pages and Plates

	Pages	Plates
July	1– 38	**1–15**
August	39– 76	**16–31**
September	77–118	**32–46**
October	119–160	**47–61**
November	161–204	**62–76**
December	205–246	**77–91**

BUILDINGS (complete)

* Illustrated; ex. exterior; in. interior; pl. plan.

INTERIORS

Index to Illustrations According to Subject—*Continued*

Key to Pages and Plates

	Pages	Plates
July	1–38	1–15
August	39–76	16–31
September	77–118	32–46
October	119–160	47–61
November	161–204	62–76
December	205–246	77–91

ARCHITECTURAL DETAILS

Index to Illustrations According to Architect

Index to Illustrations According to Architect—*Continued*

Index to Articles According to Subject

Key to Pages and Plates

	Pages	Plates
July	1– 38	**1–15**
August	39– 76	**16–31**
September	77–118	**32–46**
October	119–160	**47–61**
November	161–204	**62–76**
December	205–246	**77–91**

Numbers preceded by month and **Ser.** refer to Service Section

* Illustrated: ex. exterior; in. interior; pl. plan.

Index to Articles According to Subject—*Continued*

* Illustrated; ex. exterior; in. interior; pl. plan

THE ARCHITECTURAL FORUM

VOLUME XXXV NUMBER 1

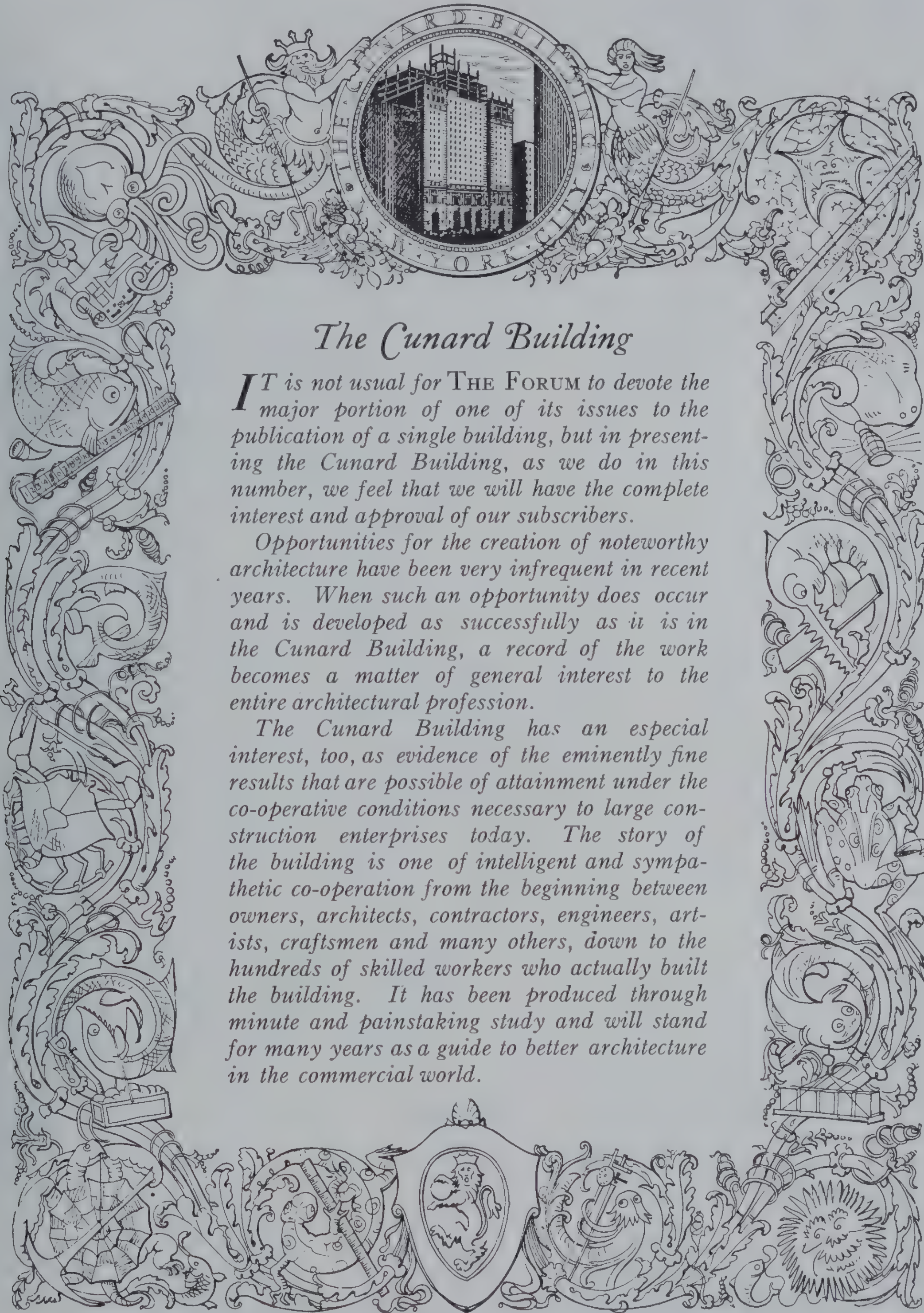
CONTENTS for JULY 1921

ALBERT J. MacDONALD, Editor

Published Monthly by
ROGERS AND MANSON COMPANY
142 Berkeley Street, Boston 17, Mass.
Advertising Department, 103 Park Avenue, New York
Yearly Subscription, payable in advance, U.S.A., Insular Possessions and Cuba, $6.00
Canada .... $6.75 Foreign Countries in the Postal Union, 7.50
Single Copies .... 60 cents All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.

Albert J. MacDonald, Pres. and Treas., S. Howard Myers, Vice-Pres., Robert Sweet, Sec.

THE EDITOR'S FORUM



The Cunard Building

IT is not usual for THE FORUM *to devote the major portion of one of its issues to the publication of a single building, but in presenting the Cunard Building, as we do in this number, we feel that we will have the complete interest and approval of our subscribers.*

Opportunities for the creation of noteworthy architecture have been very infrequent in recent years. When such an opportunity does occur and is developed as successfully as it is in the Cunard Building, a record of the work becomes a matter of general interest to the entire architectural profession.

The Cunard Building has an especial interest, too, as evidence of the eminently fine results that are possible of attainment under the co-operative conditions necessary to large construction enterprises today. The story of the building is one of intelligent and sympathetic co-operation from the beginning between owners, architects, contractors, engineers, artists, craftsmen and many others, down to the hundreds of skilled workers who actually built the building. It has been produced through minute and painstaking study and will stand for many years as a guide to better architecture in the commercial world.

Reproduction of menu card border by Messrs. Vegezzi and Bronson of Ezra Winter's staff for luncheon given at the building by the workers in honor of visiting officials of The Cunard Steam Ship Company, Ltd.

Seat-Operating Closets

for Institutions, Factories and Schools

THE WOLFF Quality Pressure Tank Closet is the logical installation wherever a seat-operating closet is desired.

The Bowl is of heavy construction and of special design, having a built-in recess to receive the valve. Another unique feature is that the valve recess is cleansed at every flush bv means of the rim perforations.

The Valve insures a vigorous flush—and is typical of Wolff Quality in both its substantial construction and its ease of replacement.

Our Service Department will gladly co-operate with further information about this or any other plumbing equipment for any purpose.

WOLFF

Sanitary Enamelware · Range Boilers
Potteryware · Marble · Brass Goods

WOLFF MANUFACTURING CO.
TRADE MARK
CHICAGO

CHICAGO
DALLAS
DENVER
OMAHA

ST. LOUIS
HAMMOND
CINCINNATI

Established 1855

Pageant of Progress Exposition at Chicago's $5,000,000 Municipal Pier, July 30—Aug. 14

"SIR FRANCIS DRAKE'S GOLDEN HIND"

Pendentive painted by Ezra Winter

GREAT HALL, CUNARD BUILDING, NEW YORK, N. Y.

The
ARCHITECTURAL
FORUM

VOLUME XXXV JULY 1921 NUMBER 1

The Cunard Building

A GREAT ACHIEVEMENT IN NEW YORK, BY BENJAMIN WISTAR MORRIS

By ROYAL CORTISSOZ

UNDER the pressure of commercial conditions, and perhaps of their own bad taste, some of our designers of tall buildings have in recent years turned their backs upon architecture. They have been content to produce, instead, simply skyscrapers and hotels. It is undeniable that from a certain point of view they have produced these things very well. The huge office building and the huge hotel or apartment house are all as poignantly expressive of American life as the cathedral of Amiens is expressive of French life in the middle ages. If the genius of a people is reflected in great hives of living rooms and business offices, then the inventors of a new category in American building have at least been true to their race. We may chuckle derisively over the hotel lobby swamped with junk from the old world, but we know perfectly well that that is what the public wants, and the designers aforementioned know how to supply it. In the case of the office building the public want is based, moreover, on an irreducible public need and it is hard to find fault with the architect whose endeavors to satisfy it result only in bald prose. How is it possible to extort anything else from the steel cage principle?

I used to ponder that question when, 30 odd years ago, I studied the old Tower Building in lower Broadway, the first essay in the new mode of construction, and from the vantage ground of McKim, Mead & White's office I watched the experiments going on all over the country. I have been watching and pondering ever since, and observing that in the steel cage principle there is, after all, nothing inimical to architecture—granting that the right hands are at work. Distinctly practical elements have naturally always been to the fore in this matter and when Daniel H. Burnham took hold, in Chicago, it was primarily as a practical man that he won his resounding triumphs. In the making of an office building he saw that organization of plan was everything. He was strong in the management of circulation and illumination. In the long reflections on this subject to which I have ventured to refer, those phases of the problem have been intensely interesting. But if they have deepened my appreciation of architects as practical men they have also thrown me back with a stronger conviction upon consideration of their function as artists. There, in fact, lies the nubbin of the whole business. It is in proportion to his purely æsthetic gifts that the designer of tall buildings produces—architecture. Looking back over a crowded period, during which architecture has outstripped all the other arts in America, one is driven to the conclusion that the best buildings are those which not only embody good solutions of practical problems but, like our best paintings and statues, denote vision and personality. I emphasize a point which ought to be, perhaps, trite enough, because as a matter of fact so many architects seem to have thrown it overboard.

Not long ago I had the opportunity of seeing a group of buildings which I had known before only in photographs and drawings—the court house and jail designed by Richardson for Pittsburgh. It was a positively thrilling experience. To stand in the presence of these buildings is to feel the spell of organic architecture, of walls vitalized by the genius of a creative artist. Composition has here a recognizable purpose, a beginning, a middle and an end, fused in the light of reason. Memory of the superb tower, of the heroically conceived jail, is as moving as memory of a pile like Carcassonne. When I came, soon after, to the Cunard Building I had something of the same sensation. I knew at once that Mr. Morris, like Richardson, had had a creative impulse. I have been immensely impressed by the convenience, the ingenious handling of space, and all the nominally prosaic virtues of his design, but what makes it exciting is its beauty, the proof it affords that a skyscraper may be made a work of art.

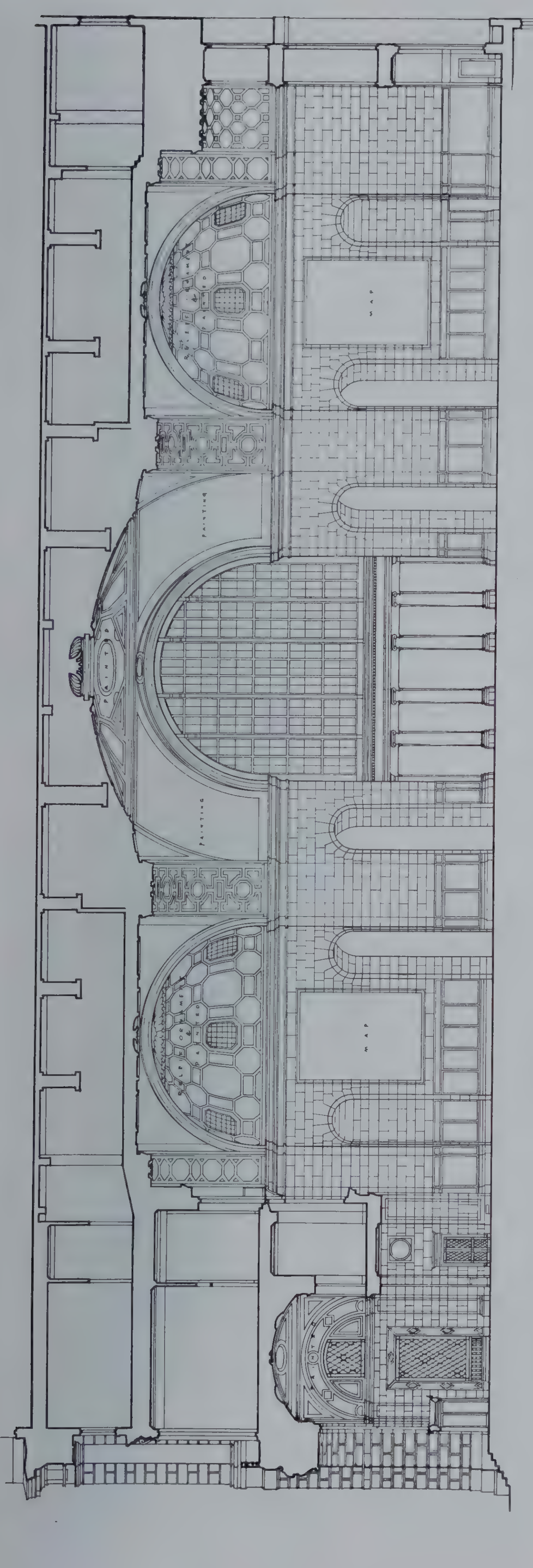
It is fairly fortunate in its site, the site whereon New Amsterdam was founded. Bowling Green gives the thoroughfare some width just before it settles down to the straight and narrow constriction of Broadway, and, for once, a skyscraper may be seen in something like perspective. In respect to style, Mr. Morris might be said to have taken

his cue from the Italian renaissance, but he must have been influenced also, I think, by the spirit of the institution he had set out to house. The Cunard Line is unquestionably an institution. The ships first set going between Halifax and Liverpool in 1840 can claim, in their way, an alliance with the imperial fleets. Their captains touch hands, so to say, with the early mariners who laid the foundations of England's sea power. Mr. Morris has kept this in mind. The first stages of his facade are exactly expressive in their simplicity and strength of a vast business historically identified with the sea, and rooted in a profoundly British tradition. The home offices of the Cunard Line in Liverpool, erected not long since, have a square-built, almost fortress-like aspect. Mr. Morris has followed in New York the same motives of weight and dignity. His massive courses of rusticated stone, broken by five monumental arches, may have an Italian precedent, but the perfect base they provide is in harmony with all the ideas of might lying behind the assertion that "Britannia rules the waves."

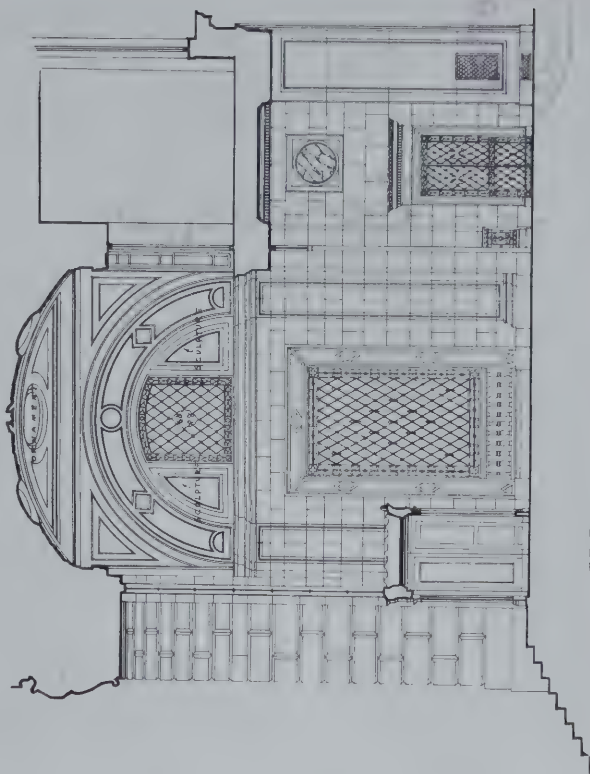
There is a charming decorative touch discoverable here. I say "discoverable," because one does not immediately notice the delicate carving on the two small window frames flanking the southern entrance arch. When you do find it you are struck by its modest felicity, by the manner in which the artist seizes a chance to lighten the mass. As you savor the grace and elegance of this ornamentation and its happy effect at the particular spot you realize also how "judgmatic" Mr. Morris has been. It is characteristic. He has placed decoration only where decoration has been fitting. There are no teasing details to disturb the calm of these noble walls. The arched base, like the pillared stage it carries, is refined very nearly to the point of austerity. As the facade soars to its height there are no decorative littlenesses to mar the broad and powerful sweep of the design. But all the time the architect has been studying modes of avoiding the arid, bare, box-like effect invited by the needs of fenestration. He recesses the facade slightly, along a width sufficient to embrace eight of the windows in his row of sixteen, and the composition reaches its renewal of pillared openings at the top without a moment's threat to its essential unity. He modulates his surface, if I may so express it, gains in light and shade, without having recourse to any specious "picturesque" expedients.

The cornice counts only on the central portion of the building, and the full force of an ideal climax is thereby renounced. I cannot help regretting this. A great cornice is a joy by itself. But Mr. Morris has made the best of the situation imposed upon him by the zoning laws and the stepping of the topmost stories. If he could not let himself go in a cornice worthy of the base on which

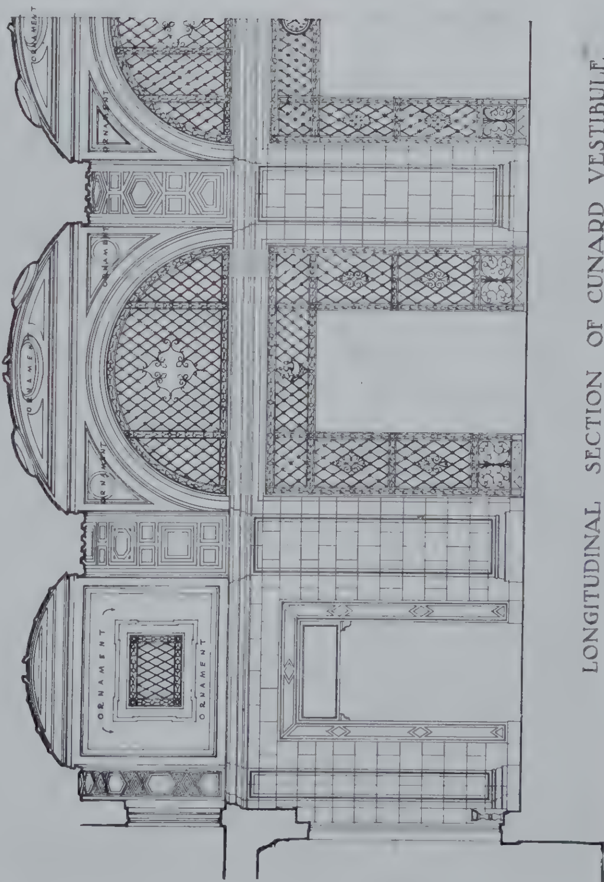
Detail of Lower Stories on Main Facade



LONGITUDINAL SECTION OF GREAT HALL LOOKING SOUTH
SCALE 0 5 10 15 20 25 FEET



CROSS SECTION OF CUNARD VESTIBULE
LOOKING SOUTH
SCALE 0 5 10 15 FEET



LONGITUDINAL SECTION OF CUNARD VESTIBULE
LOOKING WEST
SCALE 0 5 10 15 FEET


Gate to Clerical Department of Cunard Line

his building rests he has at all events played with his varied roof lines so skillfully that they hold together and adequately crown the whole. It is the whole that registers his authority, the binding of the building, line and mass, into one beautiful chord, not only just in proportions but lightly touched, with the living quality that in such designs is so rare. Gone is the deadness, the inertia, the banality, of the skyscraper to which allusion was made at the outset of these remarks. Gone is the empty gesture of adventitious ornament. This is indeed organic architecture. The facade holds you by its beauty and at the same time it persuades you that it is the outward, visible sign of an inward interest, a good plan.

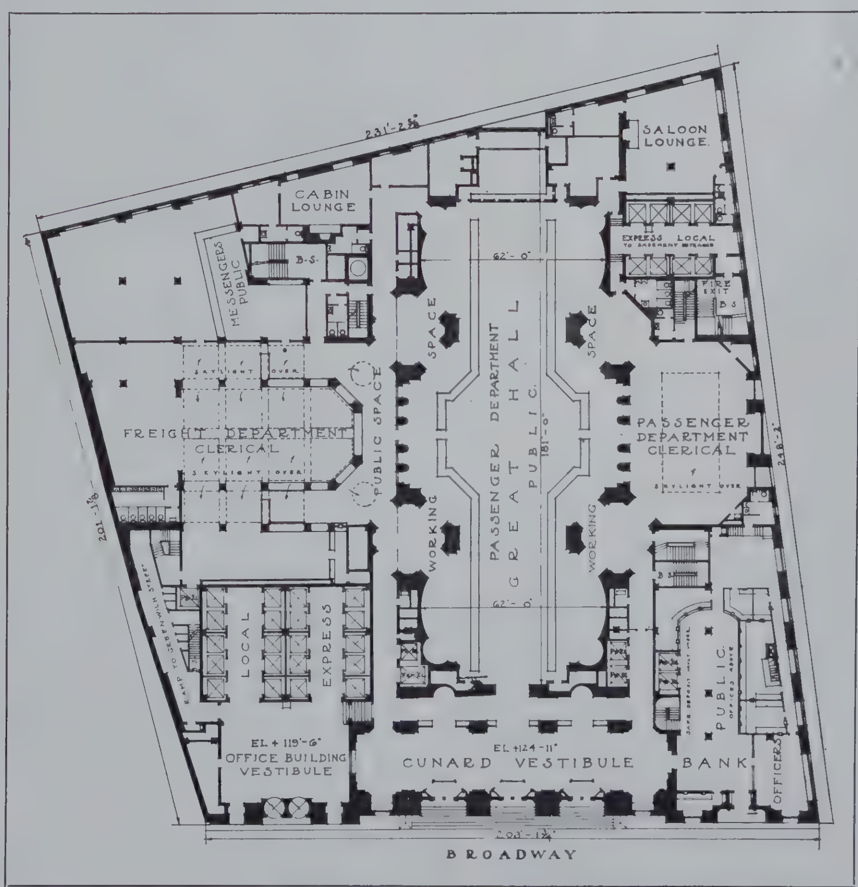
One thinks again, as is proper, of the Cunard tradition, on entering the building. The northern arch gives access to a bank, the southern to the hall from which elevators rise. The three central arches are Cunard arches, dominating a vestibule which leads to the company's vast rotunda, and this vestibule might alone provide the theme for a homily on the genius of business. Business *is* business, as it is here understood. There are no extraneous facilities in the Cunard Building. There is no restaurant. There is no barber shop. There are no booths for the sale of papers, theater tickets, flowers and what not. The vestibule with its coffered and delicately tinted ceiling is as purely monumental as the Italian palazzo interior it suggests. It includes, too, a feature which like the external carvings I have mentioned points to Mr. Morris' wise use of decoration when it is permissible. He has filled the spaces between the piers with magnificent iron grilles. Delicately designed, yet with the quiet force in them that befits the metal, they make the most discreet possible enrichment of the


Detail of Mechanics and Metals National Bank, Cunard Building

ensemble. I ought to mention at this point a detail in the floor plan which has a peculiar fascination. Crossing the vestibule we have to traverse still another parallel passage, much narrower, which terminates at right and left at passages running toward the center of the building. The usefulness of these extra channels for circulation is obvious and they have further a remarkable artistic charm. Sufficiently but not brilliantly lighted, they bring an almost romantic element into the scheme, vistas both intimate and mysterious. There is nothing more engaging in the development of the plan than these quiet aisles, unobtrusively enframing the rotunda.

The rotunda or great hall is an imposing tour de force. McKim was Roman when he conceived the grand spaces of the Pennsylvania Terminal. Mr. Morris has been Medicean in the conception of his Cunard hall, a deep, domed chamber extending through to the back of the building. Here all the splendors of the renaissance break out on walls and ceiling. The ceiling, nearly 70 feet from the floor, at once takes the eye and promises to keep it indefinitely; but I must confess that my own first impression took in as enormously important so humdrum a thing as the counter over which the public traffics for its tickets. It runs down the hall on each side, in straight lines, unbroken save beneath the central dome. The counter, like everything else in the room, is built of creamy travertine. It has a dark top, of cork. Strictly considered, it is one of the structural fundamentals of the hall, without which business could not be carried on, and it enters accordingly into the architect's imaginative purpose. The pure linear effect of the thing is very beautiful, telling incessantly in the web of design that Mr. Morris has worked out. The unity of the facade comes once more into mind. The domes rest majestically on their piers. The piers are so composed as to make a well knit sequence. From the four "luminary squares" which they form at the corners of the central dome, and from other sources, there comes an admirably diffused light. The travertine sets the whole in a mellow key and in Barry Faulkner's immense maps on the walls, showing the Cunard routes, and in Ezra Winter's paintings on the ceiling and the four pendentives, illustrating the history and mythology of the sea, this key is transmuted into sumptuous warmth. On the floor, in the center, the points of the compass are indicated in marble, encircled by figures in low relief, a bronze modeled by John Gregory. Yes, Medicean is the word. You have a sense of business raised to a higher power, taking luxury in its stride. In style and in spirit the room is an evocation of Italy. But it has stirred me as I was stirred by Richardson's tower and jail walls, feeling above all things the play of a genuine architectural inspiration, springing straight from the personality of the designer. Mr. Morris' imagination rather than his scholarship, I take it, is responsible for the fact that the hall is so new, so opulent, so well balanced, and, especially, like the facade, "all of a piece."

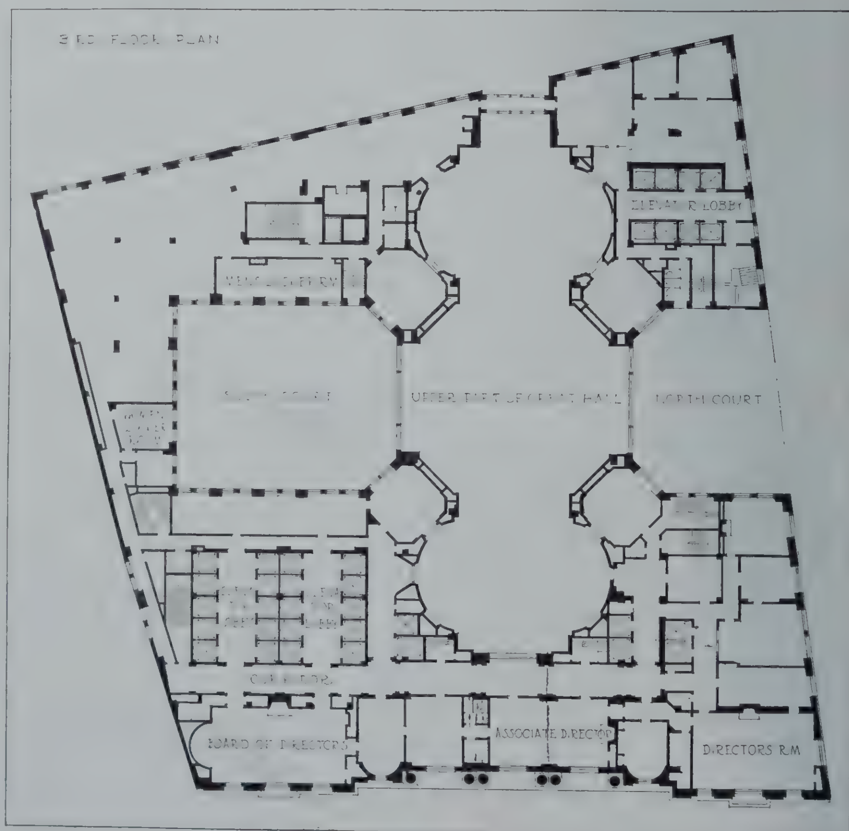
He has been fortunate in his painters, both graduates of the American Academy in Rome, and both exemplars of the principle which it is one of the particular aims of that institution to inculcate, the principle of artistic refinement. Mr. Faulkner's opportunity has been, in a measure, circumscribed. He had simply to map the continents according to Mercator's projection and to thread across the seas the paths of ships. His big panels are chiefly to be regarded as spots of color. As such they are rich, but as judiciously tempered as tapestries, governed by the sense of measure which seems to work like a "big magic" everywhere in this room. He has contrived to enliven his spaces, too, by the use of



First Floor Plan

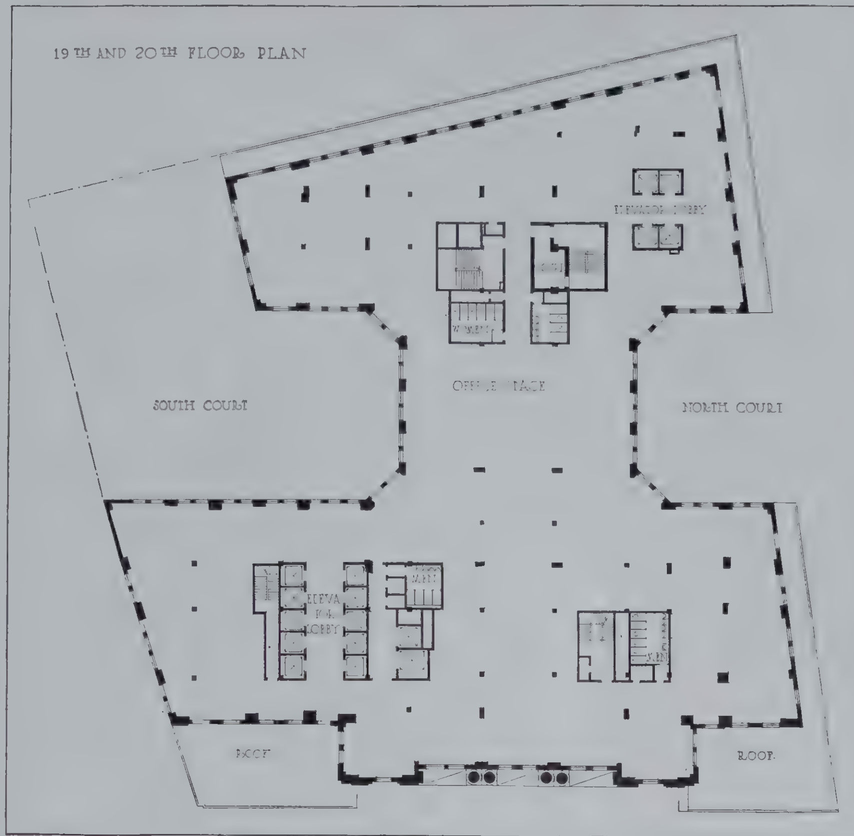
flags indicated here and there. To Mr. Winter was assigned a great task, the embellishment of the domed and vaulted ceiling pictorially and conventionally. The Italian origin of his project is clearly perceptible. In his formal decoration he recalls both Pinturicchio and Raphael. The influence of Raphael is especially apparent in the roundels of the central dome. But in the pendentives, portraits of historic types of ships, "on the inconstant billows dancing," he strikes a note of his own, and when you detach yourself from details, sweeping the whole performance at a glance, you are impressed by Mr. Winter's participation in that vitalized initiative to which one is always returning in this building. He is not the emulous disciple of the past alone, reconstructing an old motive; he is a modern painter, making a historic idiom his natural property.

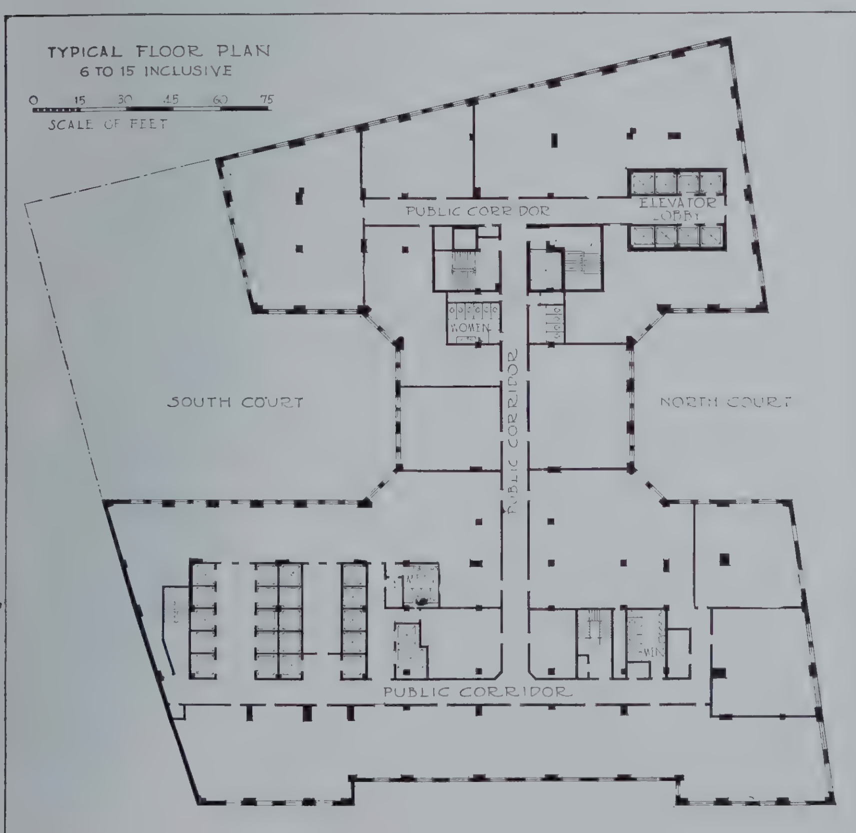
The ships in the pendentives illustrate even more eloquently than his more formal motives the thoroughly mural character of his art. They are the stout hulls of Leif Ericson, Columbus, Cabot and Drake, borne over high seas by swelling sails. The Spanish and British vessels are, of course, towering structures. The viking craft, though shallower, is sturdily built. Bold, pure color in each case enforces the accent of rude strength which belongs to the subjects. The pendentives are on a massive scale. Mr. Winter's compositions are precisely fitted to them in spirit—they fulfill an architectural purpose. Yet the air of the sea blows through them; there is life as well as a certain decorative serenity in them. So it is with the roundels, in which spirited figures of tritons, mermaids and the like are rather shrewdly but freely adjusted to the given spaces. The broad effect is glittering, gorgeous. Yet always—and this is where one recognizes at their best the influences of the Roman Academy—the painter's delightful fervor is kept wonderfully in check. His forms suggest that he has drunk deep of the lessons implicit in Raphael's great series in the Rospigliosi. The panels in which he has symbolized the winds and the seasons, in exquisitely modeled reliefs,



have alike a renaissance luxuriance and a renaissance restraint. He is the deft craftsman as well as the robust painter and I hardly know which is the more winning, his deftness or his easy, virile swing. He seems to me a kind of Giulio Romano come again, with a modern polish and an individual reserve force.

Mr. Winter's work makes its mark brilliantly and so conspicuously that it would be rather natural, I dare say, for the visitor to carry away an impression of it as supplying the *clou* of the building. And there are other kindred episodes, as we have seen—the maps, the compass with Mr. Gregory's antique but not by any means archæological procession, a bronze equally beguiling in design and in technique, and various grilles. In some minor offices tucked away in the western corners of the ground floor there are bits of stained glass which are well worth while. Decidedly there is decorative material and to spare. In the executive offices on the third floor Mr. Morris has been able to indulge himself in interesting paneling, mantelpieces and the like. The Medicean atmosphere continues, a tone of luxury being maintained through elements of spaciousness, stateliness, good proportions, good taste.





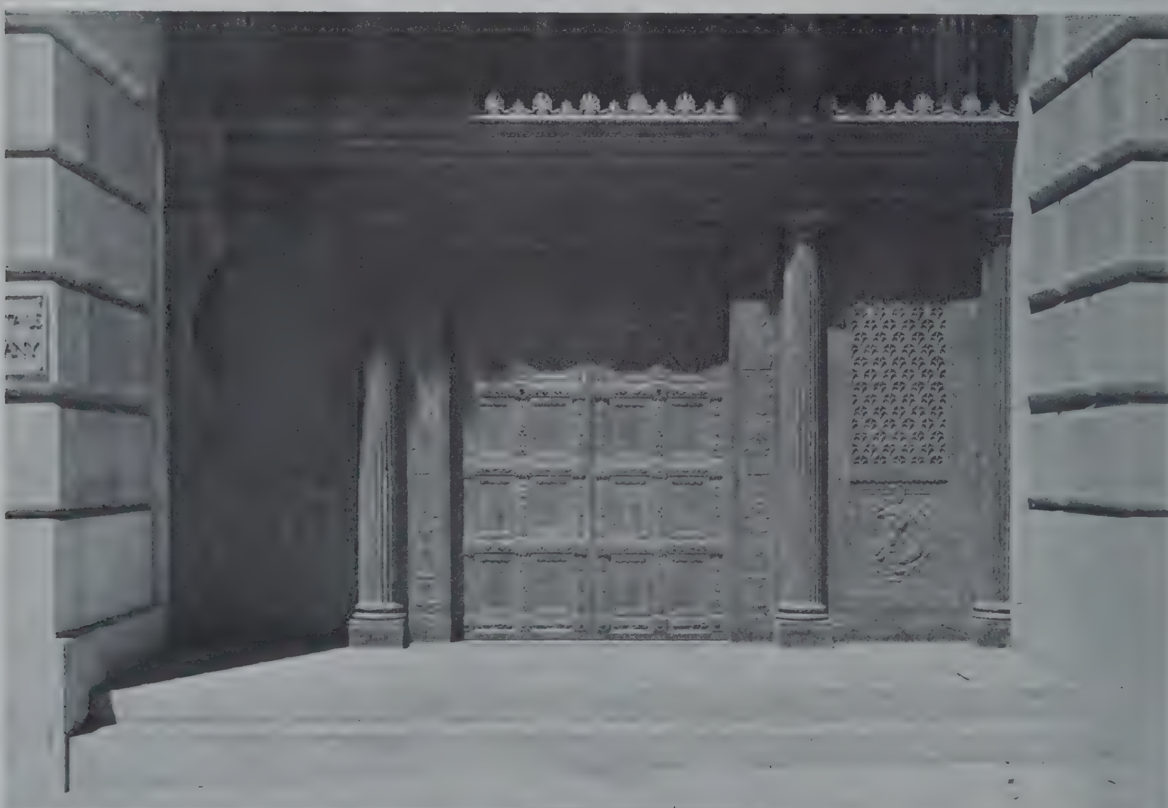
But having noted all this, the factors that remain for comment revive the element of purely constructive design to which, in the long run, Mr. Morris owes the success of the building.

I have mentioned the æsthetic charm joined to the utility of the little aisles on three sides of the great hall. Charm necessarily disappears from the upper floors, but the utility persists in edifying form. I need not describe in detail plans which are reproduced in these pages. But I may at least pause upon the fine architectural rectitude of them all. The succeeding floors above those filled by the Cunard Company are linked with exhilarating adroitness to an indispensable resource,—the light. It is the architect's proud boast that there is not an interior office in the building, and I have seen how true this is. He has to thank the

power of steel for the blessing. It permitted him to rear part of the structure directly above the dome in the rotunda, thus doing away with the usual central wall. The building has frontages on three streets, and, by good luck, contact with the light coming from a fourth. Deep courts in the middle of the north and south facades give to the offices in the center as good light as pours into the street fronts. This arrangement of the plan secures also the most economical disposition of space for corridor circulation. The clustering of elevators at the southeast and northwest corners also perfectly contributes toward the handling of this latter problem. There is no waste or awkwardness anywhere.

The sub-dividing of floor space is largely determined, of course, in these modern buildings, by the wishes of tenants. The spaces between corridors and window walls are cut up to please them. One firm will take an entire floor and, to a certain extent, frame its own plan. Exploring such a floor in the long series of 22, I noticed a change which is slowly establishing itself. The familiar ground glass was gone from the partitions. Clear glass had taken its place. It was as though the roof had been lifted from a busy hive, disclosing the activities in every last little cell. This transformation is due, I am told, to a development in latter-day "efficiency." It allows the executives to keep an eye on everybody, to see that the occupant of no desk is idle. There is really no petty watchfulness about it, I gathered from a banker with whom I discussed the subject. "It all makes," he pithily said, "for an increase in the solidarity of the corps. It is a matter of psychology." I find an incident of this sort somehow subtly humanizing to the whole spectacle presented by such an edifice as the Cunard Building. The thing is rooted in transactions that cover the habitable globe. It begins with the imperial traits of the great decorated hall. It rises through layer after layer of humming floors to a broad roof upon which one or two offices with huge fireplaces and picturesque loggias look down the bay toward the hurrying fleets. There broods over it the spirit of a veritable cosmos. Figures, queer statistical figures, accompany in the accustomed way this colossal fabric. We are told that the Cunard Building has frontages of so many feet, that it covers a prodigious area, rising to a total, when all the floors are counted in, of 660,000 square feet, and so on and so on. But irresistibly the merely human appeal of the thing strikes home.

What an epic Balzac could have devised with a building like this for his theme! All manner of far-reaching implications suggest themselves in the grandiose nature of the facade and the great hall; the ineffable power of the machine which the whole building constitutes, the tremendous potentialities of the business units populating the place—and perhaps, too, the moral of those clear glass partitions. You cannot regard such a cosmos as an insensate thing of stone and metal. You feel in it the force of a living organism. So, I believe, Mr. Morris imaginatively grasped the idea of the Cunard Building from the start, and he has bodied it forth, in a great work of architecture, alive and beautiful.



Broadway Entrance of Mechanics and Metals National Bank, Cunard Building

MAIN FACADE

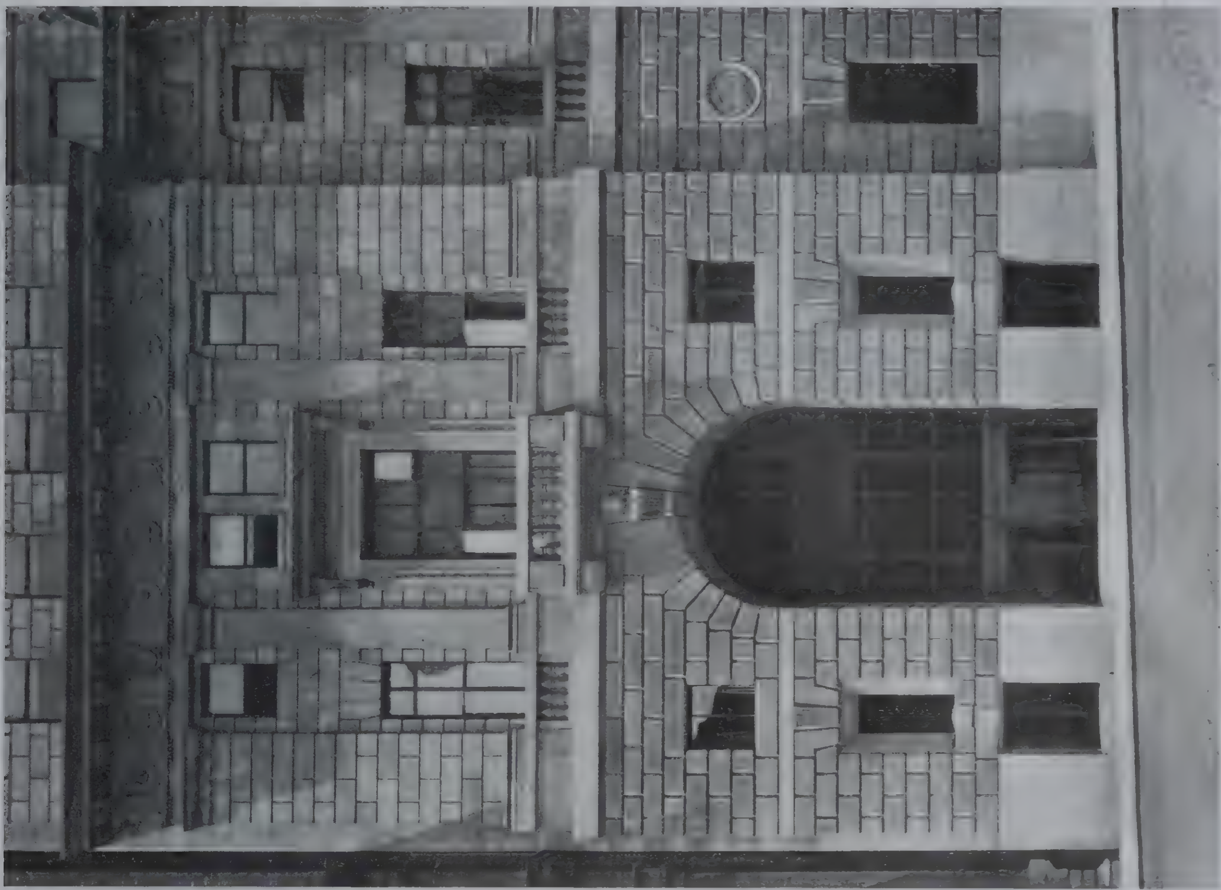
CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

DETAIL OF MAIN FACADE

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS



OFFICE BUILDING ENTRANCE

OFFICE BUILDING VESTIBULE

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRÈRE & HASTINGS, CONSULTING ARCHITECTS

VESTIBULE, CUNARD STEAM SHIP COMPANY OFFICES

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

VIEW TOWARD FRONT OF GREAT HALL

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

Mural Decorations of the Cunard Building

By EZRA WINTER

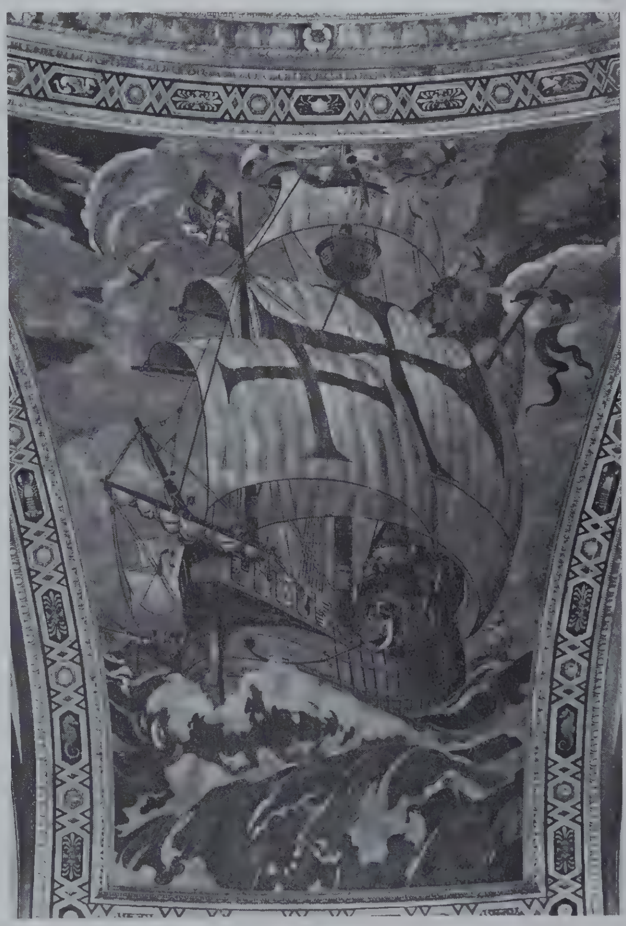
THE execution of the ceiling decorations in the vestibule and the great hall of the Cunard Building presented a number of problems, in the solution of which considerable ingenuity was required.

In planning the arrangement of decorations for such large ceiling spaces it became necessary to rely to a considerable extent upon the resources of sculptural relief and modeled ornament in order to make easy and natural the often abrupt transition from the plain, architectural surfaces of walls to the painted portions of the ceilings. The function of modeled ornament, in this instance, was chiefly to soften or modify what might otherwise have been the undue austerity of flat wall areas and equally flat ceiling surfaces.

What might be called the "time limit" was absolutely fixed and it was necessary that it be closely adhered to. Since the decorations of ceilings must obviously be governed by the completion of their construction, no more than four months could be allowed for work upon the paintings *in situ*. With this exacting time limit as the governing factor all the necessary plans and sketches were prepared, which provided for a judicious balance of decorative composition—sculptural relief, modeled ornament and spaces to receive ornamental painting—so that the entire work might be divided and distributed among various artists and craftsmen.

In preparation for the work fully two months were spent working at half-inch scale, and at this scale every detail was considered, including the pattern of the ornament and the subject matter of the pictorial compositions and sculptural relief. Careful drawings were made on tracing cloth of the plans of the various portions of the ceiling, from which white prints were made and on these different color schemes were studied. At the same time blue prints of these drawings were issued through the architect's office to the modelers, plaster workers and builders.

Then began the dividing up of the work; the ornamental relief and fields of painted arabesques were turned over to draftsmen to be developed and studied at full size. Sketches for the proposed sculptural decorations were turned over to the sculptor



Pendentives in the Great Hall
The Ships of Leif Ericson and Christopher Columbus. Painted by Ezra Winter

·VAULTED·CEILING·IN·GREAT·HALL·
·CUNARD·BUILDING·
·25·BROADWAY NEW·YORK·CITY·
SCALE 0 1 2 3 4 5 10 FEET

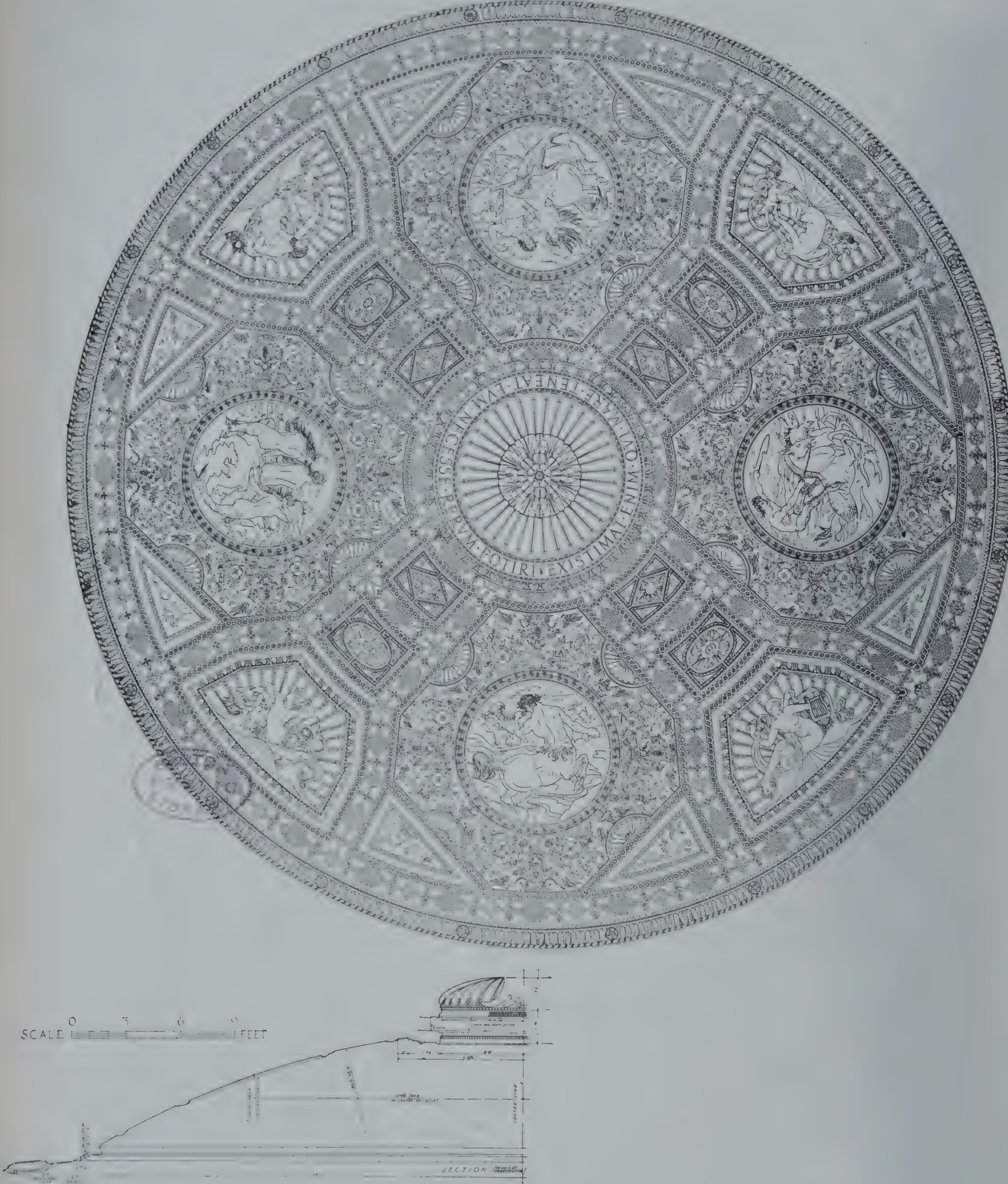
to be modeled at one-quarter full size, and at the same time the four large spandrel boat compositions and the four round compositions in the dome were carefully studied at the same scale. This occupied about three months, and during this time the character and pattern of the arabesque ornament were determined and full-size drawings for the modeled ornament were sent to the modeling shop together with the sketches prepared by the sculptor, to be modeled at full size. All work was then transferred to a temporary studio in the Cunard Building, and there full-size cartoons of the large pictorial compositions were prepared. To gain time, it was also found practicable to prepare plaster discs of the four roundels in the dome, on wire lath, so that they could be painted before the ceiling was built. This was done and, one by one, they were later lifted into place and anchored to the steel girders above, just as the sculptural panels were installed.

The next important detail to be considered was the choice of the medium to be used in painting the

VAULTED CEILING IN GREAT HALL, PAINTED BY EZRA WINTER

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS



SECTION AND DEVELOPED PLAN OF DOME IN GREAT HALL

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

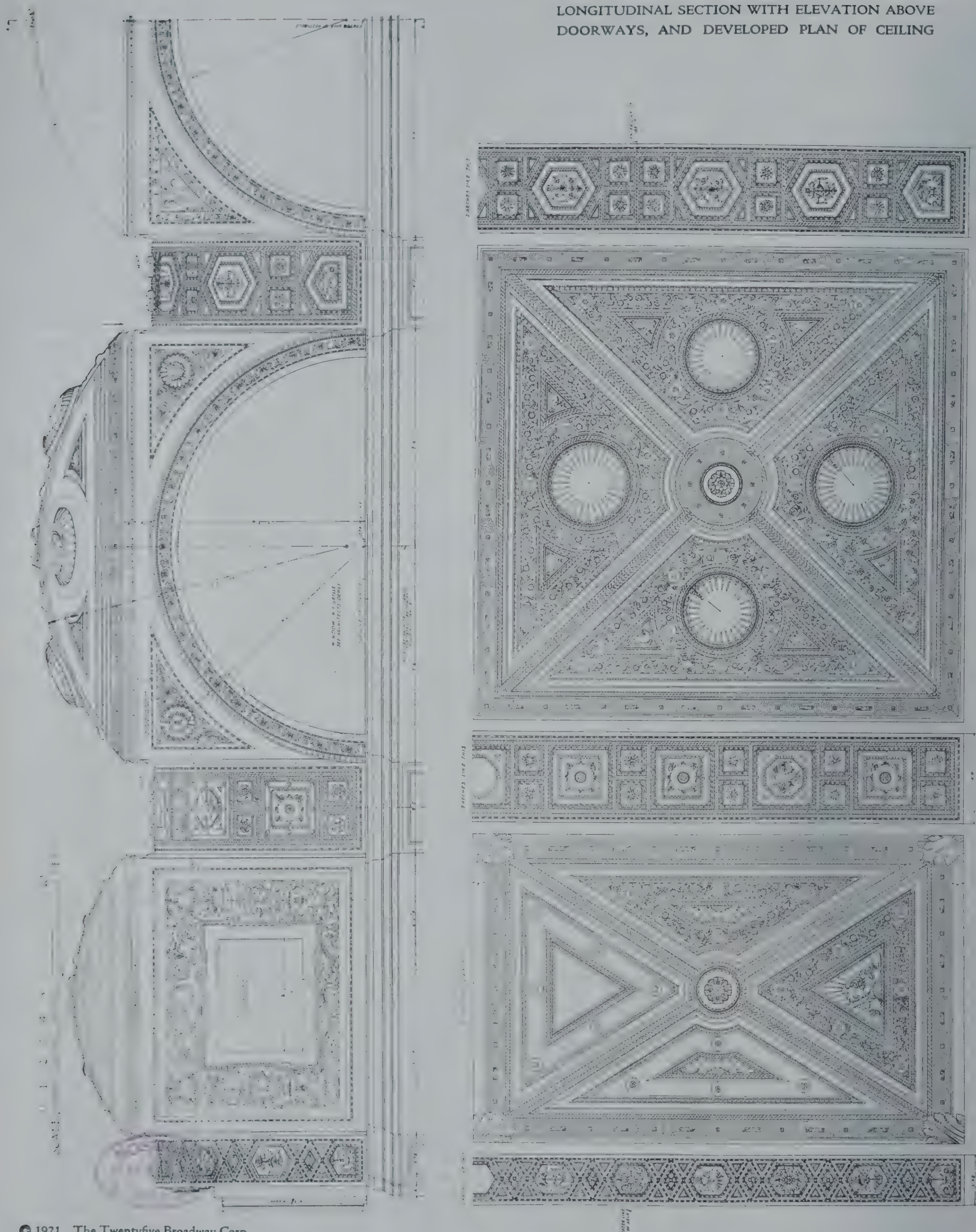
decoration. Owing to the character of the ceiling, which is all curved surface, it was impossible to consider painting the decorations in the studio on canvas and mounting them in place, as is done commonly by mural painters today, and because there are so many sources of light in the great hall it was felt that some medium should be used that would not have a shine or gloss to reflect the light. The time limit prevented the use of the renaissance method of fresco painting, and it was decided to use a variation of this method known as *fresco secco*, the difference being that the plaster, instead of being painted when it is newly applied and still wet, is allowed to dry and is then soaked with lime water before the painting begins. It is, perhaps, more like the Pompeian method of fresco in that milk or some albuminous substance is added to the lime to form the painting medium, while in the renaissance method the carbonization of the lime alone is depended upon to bind colors. The Pompeian decorators usually painted on a very smooth plaster and then rubbed it to produce the characteristic gloss or polished effect. This, however, was not desired in the case of the Cunard ceiling, and as a further precaution to prevent a shine or gloss, a sand finish was given to the plaster. The plastering is a very important part of this method of painting and since it was impossible to obtain enough old slaked lime for the execution of the ceiling, a well tried cement plaster was used rather than take the risk of using a hydrated or poorly slaked lime. It was finally decided to use a scratch coat of waterproof Portland cement and two coats of English Keene's cement as a foundation for the lime and colors used in painting.

Another problem which is always difficult of solution for the mural painter, when the heights are great and the spaces large, proved in this instance to be particularly serious. To carry on the work of decorating the ceiling spaces while the building was actually being constructed necessitated the successful handling of a complicated mechanical problem; it was necessary for the mural painters that a scaffold be built across the entire space of the dome, and yet it was equally necessary that the construction engineers have the floor beneath the dome unobstructed for their trucks to drive over, which would have prevented the building of staging for such a scaffold. This difficulty was satisfactorily solved by the engineers who provided a hanging scaffold which did not interfere in any way with the floor. In order that no interference might be had from cables attached to the ceiling, the platform was hung upon cables attached to steelwork above the dome and passing through spaces in the ceiling which were to receive plaster rosettes. This arrangement has another advantage in that if at any future time repairs are necessary, a scaffolding may be hung in the dome at any height without much difficulty or interference with the business which goes on in the great hall.

Ingenuity upon the part of the engineers solved still another problem. Upon the suspended platform which has just been described there had been

Roundel and Portion of Dome in Great Hall, Painted by Ezra Winter

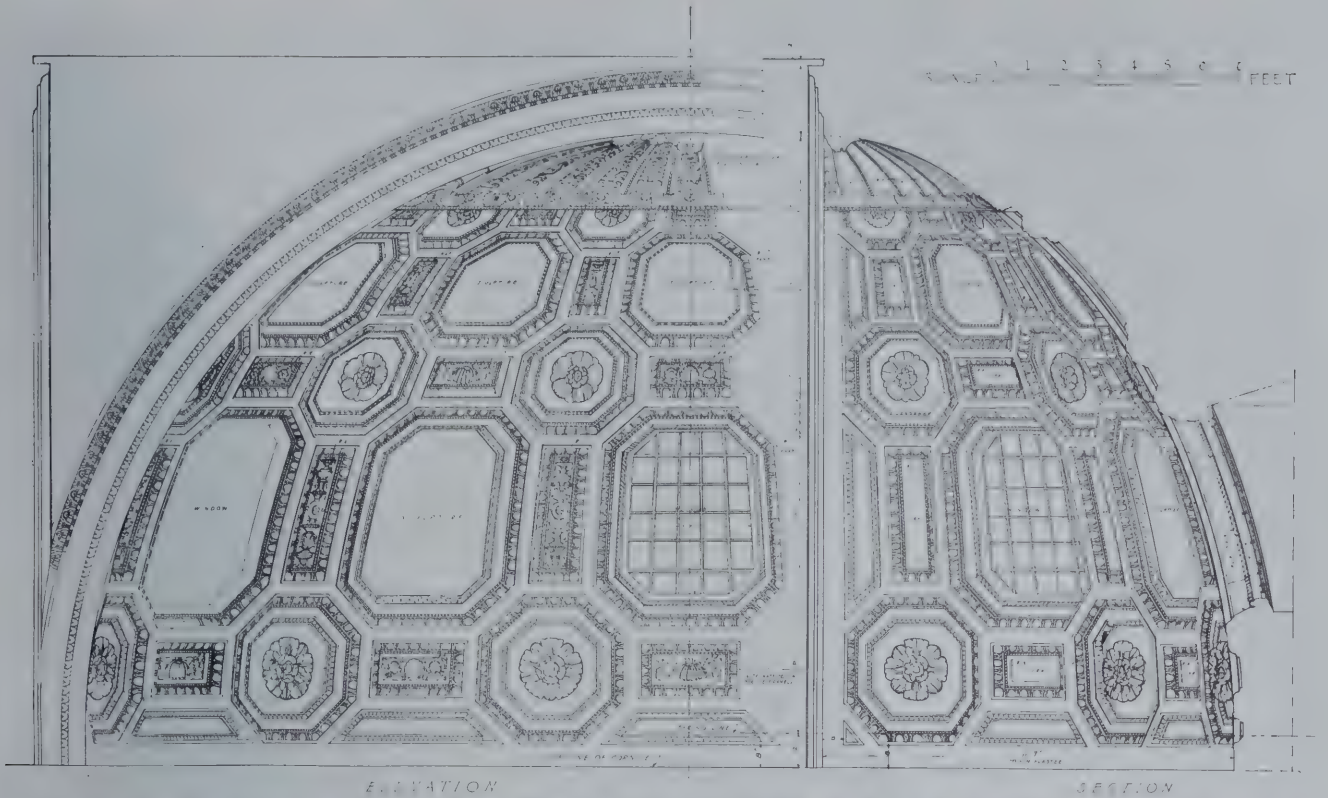
LONGITUDINAL SECTION WITH ELEVATION ABOVE DOORWAYS, AND DEVELOPED PLAN OF CEILING



DRAWINGS FOR DECORATION OF CUNARD LINE VESTIBULE BY EZRA WINTER

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS



ONE OF FOUR NICHES IN THE GREAT HALL

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

enclosed a studio, within which the work of decorating the ceiling went steadily on. This studio, however, required heating for the work was continued through the winter, and it was found to be impossible without heating for the mural painters to manage their brushes with the accuracy which was necessary. The difficulty was overcome when the builders installed a complete steam heating system in the studio upon the swinging scaffold.

The mural work in the great hall of the Cunard Building portrays the age-old romance of the sea or lure of travel. Painted in circular insets or modeled in medallions sea creatures of many kinds —tritons, mermaids and sirens—express the fascination which the sea has always possessed for the imagination of the world. Upon the great pendentives sail the ships of Leif Ericson, Christopher Columbus, Cabot and Drake, all being in a sense the forerunners of the Cunard steamships which travel some of the same ocean routes. The vessel of Leif Ericson is a viking ship with high prow ending in a gilded dragon, and upon its huge outspread sail is painted his emblem—the sea horse. The cross is emblazoned upon the sail of Columbus' vessel, and the ship of Cabot is a caravel of high decks and many colored striped sails. The vessel of Drake and the use of the Tudor emblems, the rose and three lions couchant, symbolize, perhaps, the far away beginning of what might be called the Cunard idea, for they represent the first manifestation of the vast maritime power of Great Britain.

The great hall ceiling is one of the few in this country in which strong, brilliant colors are used. There is too often a desire to execute mural work in grayed colors for fear that otherwise it will not hold its proper place. In this instance the great height of the ceiling and the enthusiastic co-operation of architect and owners gave a wide latitude in the use of color. The colors are disposed to lead the eye through progressive richness and brilliancy to the central dome. The pendentives are painted boldly, with the color of the sea providing a base. The vessels are in shades of brown with sails of lighter buffs, and insignia in bright reds and yellows. The enclosing borders show small spots of dark colors held together with interlacing bands of gold.

The east and west vaulted ceilings have a background of intense blue with a slight greenish cast. On this the renaissance ornament appears in tans and yellows, contrasting with the central panel which has a background of strong red approaching vermilion. The position of these colors is reversed in the central dome. The red becomes the background for the octagonal divisions, in which the roundels appear, and the blue is used only for the shell backgrounds of the sculptured panels. The prevailing color of the vaults is thus blue, and that of the dome red. The roundels are in light, pastel-like shades with sea green, azure and flesh color predominating. The modeled ornament, which outlines the pattern, is brilliant in light shades of yellow intensified with gold. The niches at the east and west ends and the soffits of the arches are largely in color and texture the same as the travertine walls below. Color is but lightly introduced, and is used only as a background for the modeled ornament.

Maps Painted by Barry Faulkner as Seen in Niches of the Great Hall

NICHE IN GREAT HALL

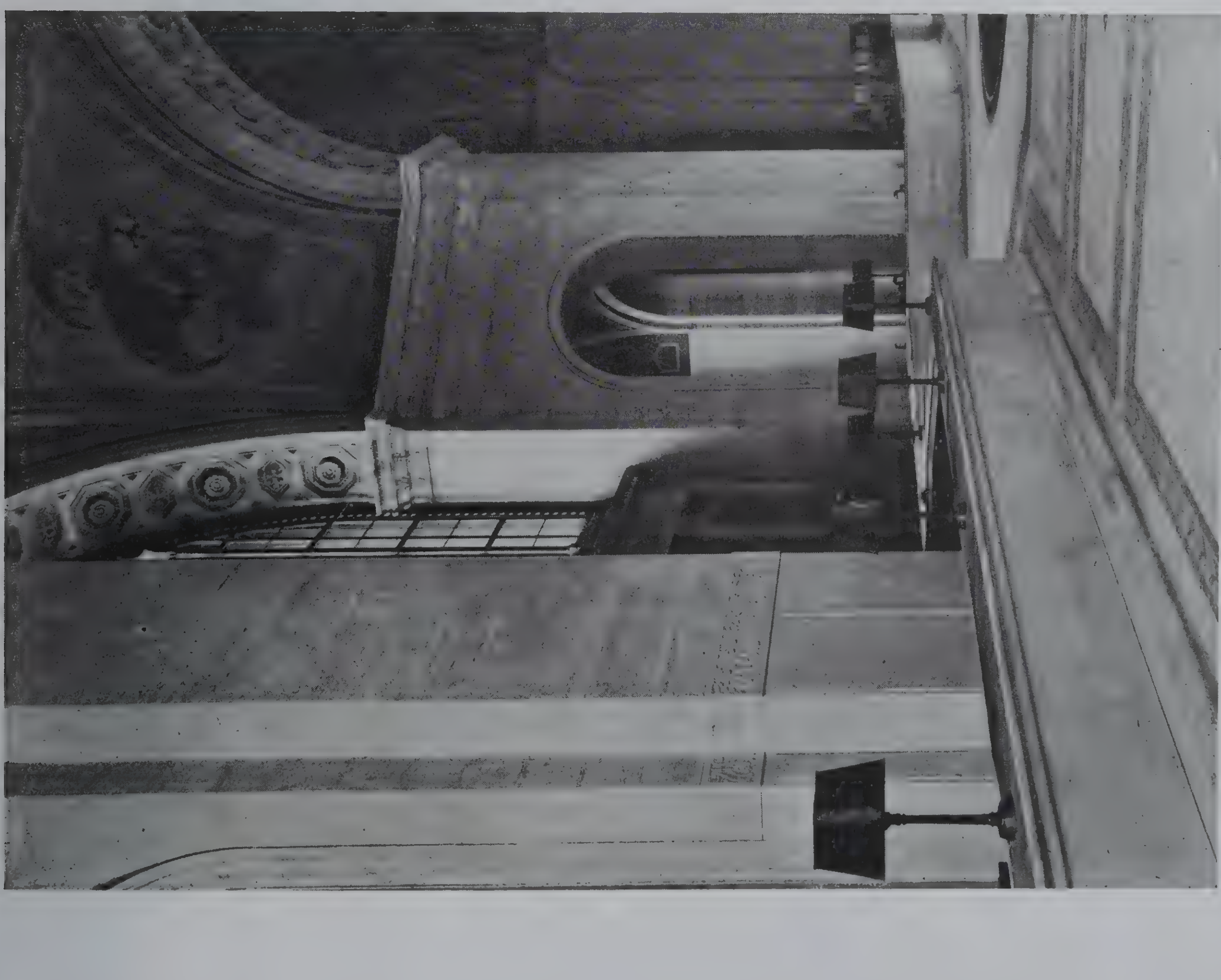
CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

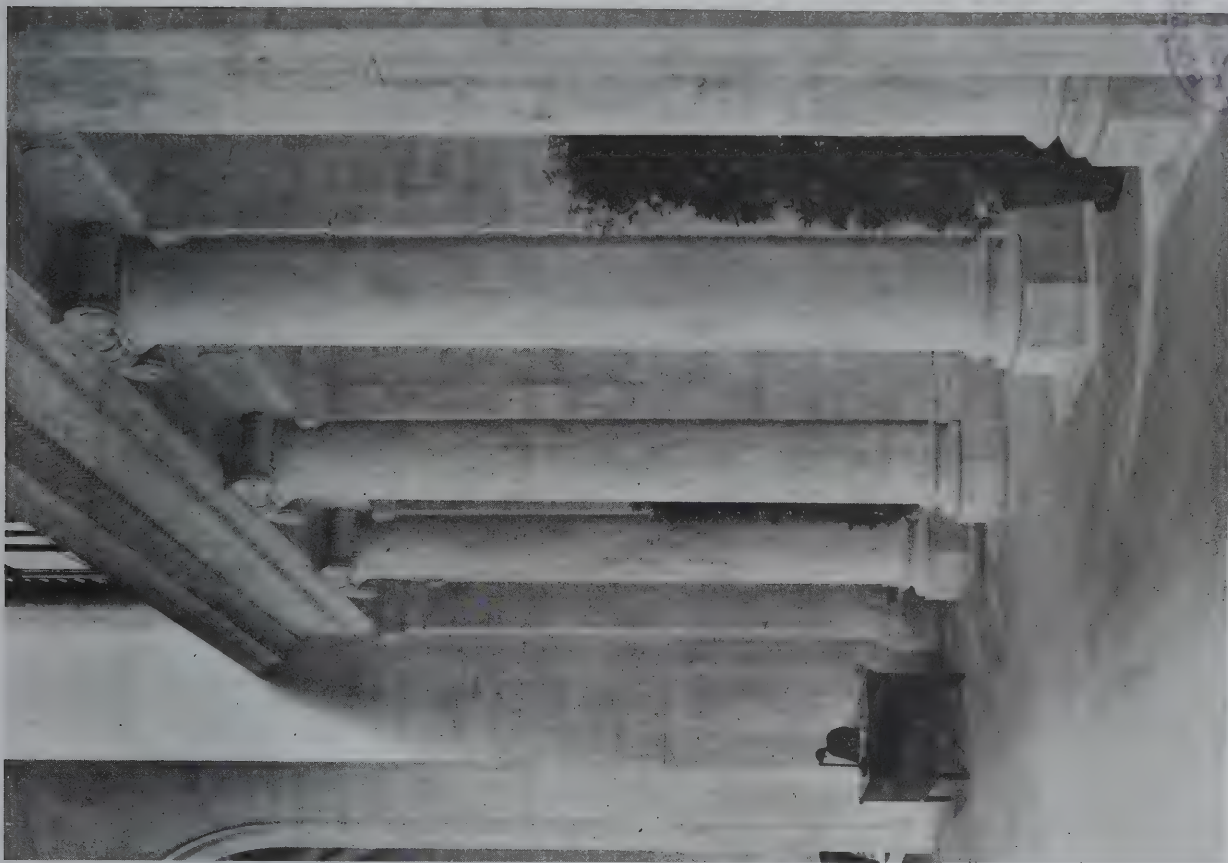
DETAIL OF GREAT HALL, FROM WORKING SPACE

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS



NORTH SIDE OF GREAT HALL



ENTRANCE TO FREIGHT DEPARTMENT

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

CEILING DETAIL OF GREAT HALL

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

CENTER OF GREAT HALL, TOWARD FREIGHT DEPARTMENT

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

GREAT HALL DOORWAY TO VESTIBULE

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

Structural Features of the Cunard Building, New York

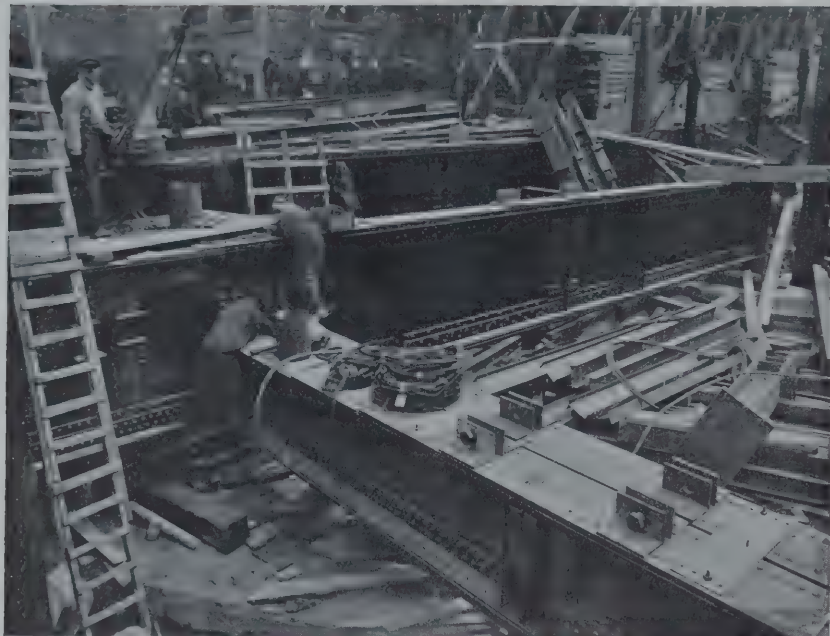
By S. O. MILLER, C.E.

IN looking at the completed Cunard Building, one is tremendously impressed with the vastness and magnificence of the "great hall." Producing this great open space and carrying the weight of building above it made necessary some record achievements of structural work, particularly the large plate girders across the long part of the span, which were the heaviest per foot ever fabricated at the plant of the company that furnished the steel. This feature of the work, however, from the standpoint of the designer, was not the most difficult; that part is now covered up and hidden and, to a large extent, already forgotten—the carrying of the structure over the double-track subway which traverses the building site from northwest to southeast on a curve, and which made it necessary to have many and complicated girders, bolsters and columns to carry the main loads of the building down to solid rock, independently of the subway's structure.

The property on which the building is located was assembled from a number of separate parcels of land; the subway engineers assumed that each piece of land would be improved by the erection of an individual tall building and they made column layouts to fit the requirements of each parcel, and provided in the roof of their subway structure, steelwork designed to carry these loads. When the column layout for the building, taking the plot as a whole, was made, as can readily be imagined, the positions of the projected columns did not fit the positions provided in the subway structure for the loads; it would have made necessary a jumble of complicated girders to take the loads at the points provided. The question of vibration in the building, from the subway trains passing underneath, was then taken up and some of the methods that had been attempted in other places to reduce such vibration, were gone into and discussed but they did not seem likely to produce good results. It was decided to put the weight of the building directly upon the rock and on footings entirely independent of those supporting the subway; this, it was felt, would produce less vibration than by using the subway structure and did not seem to involve much more in cost of steel. The building grillages in every case were carried down at least to the level of the adjacent subway footings. This, in many instances, necessitated sinking the footings far below the sub-basement floor. The result of this method of construction has so far proved entirely successful as the vibration from the subway trains is hardly noticed and the extra expense is fully justified as there was considerable anxiety on this account.

Referring to the plan of the subway girders (Fig. 3) it may be seen that these girders span the subway in a more or less haphazard manner. This was

Nine Girders in Foreground over Subway Carry Concentrated Load of 4,200 tons

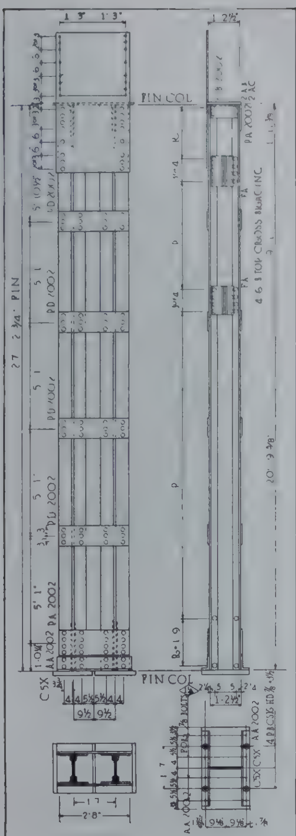


Detail of Framing over Subway Structure Near Greenwich Street
Hitch Angles May Be Seen on Tops of Girders

caused by an effort to carry the column loads of the building with the shortest possible spans over the subway, and also by the fact that the form of the subway structure was not only a curve but involved breaks of various kinds, some of which were particularly unfortunate in their locations. The floor levels of the basement limited the depth of girders that could be used for this purpose, and unfortunately, where the heaviest load came, imposed by the corner columns of the great hall, there was the least clearance and the longest span over the subway. At this point 3 columns came down above the subway structure, carrying a total load of 4,200 tons. To bear this load, 9 plate girders, side by side, spanned the subway supported by 18 columns, 2 columns being on the axis of each girder. These girders are marked on the plan G18X and G18Y, there being 4 of the Xs and 5 of the Ys. The main material of the X group was a web plate, 68″ x ⅞″, a total length of 66′ 10¼″; the flange angles were 8″ x 6″ x 1″, and 5 cover plates on each flange 14″ x 1″ thick, making a total cover plate thickness on each flange of 5″. The Y girders of this group have the same web and flange angles, but the total cover plate thickness is 3⅝″. The weight of one of the X girders was 29 tons, and the weight of the entire group of 9 girders with the bolsters, which distributed the load over these girders, amounted to 276 tons. The detail drawing of a part of one of the X girders is shown in Fig. 4.

The system in supporting the other building columns over the subway was similar, but in no other case was there such a heavy concentration of loads, and from 2 to 4 girders were used as a unit spanning the subway. In each case the system of the group of 9 girders was followed, that is, to place a separate column under the end of each individual plate girder; these groups of columns, side by side, were fastened together with angles to make them one unit. The detail of one of these groups, consisting of 2 columns, is

Developed Elevation of Columns and Plan of Girders Spanning Subway (Fig. 3)



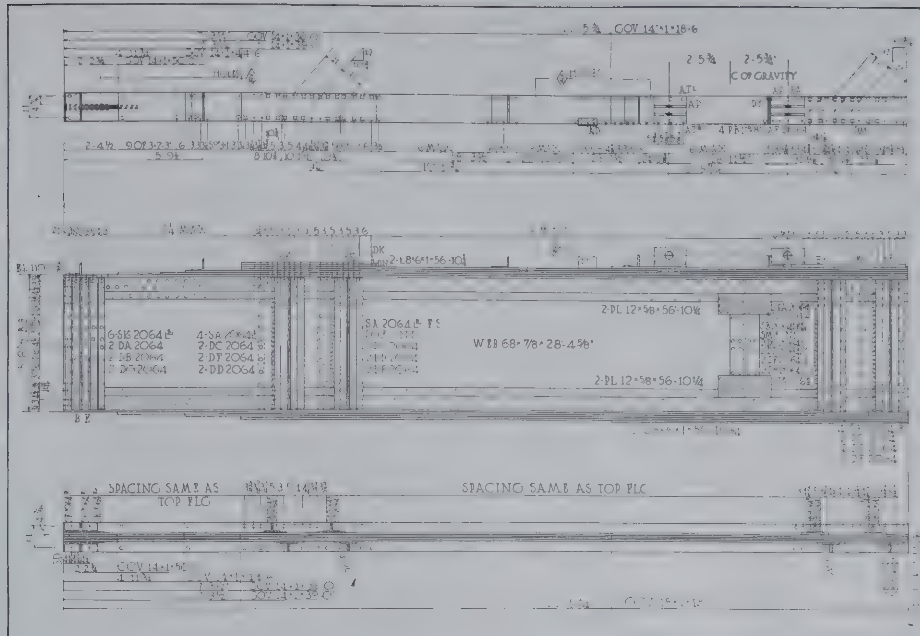


Fig. 4. Part Detail of One of Four Girders Marked X on Fig. 3.

Fig. 5 Detail of Group Columns Used around Subway. See Fig. 3.

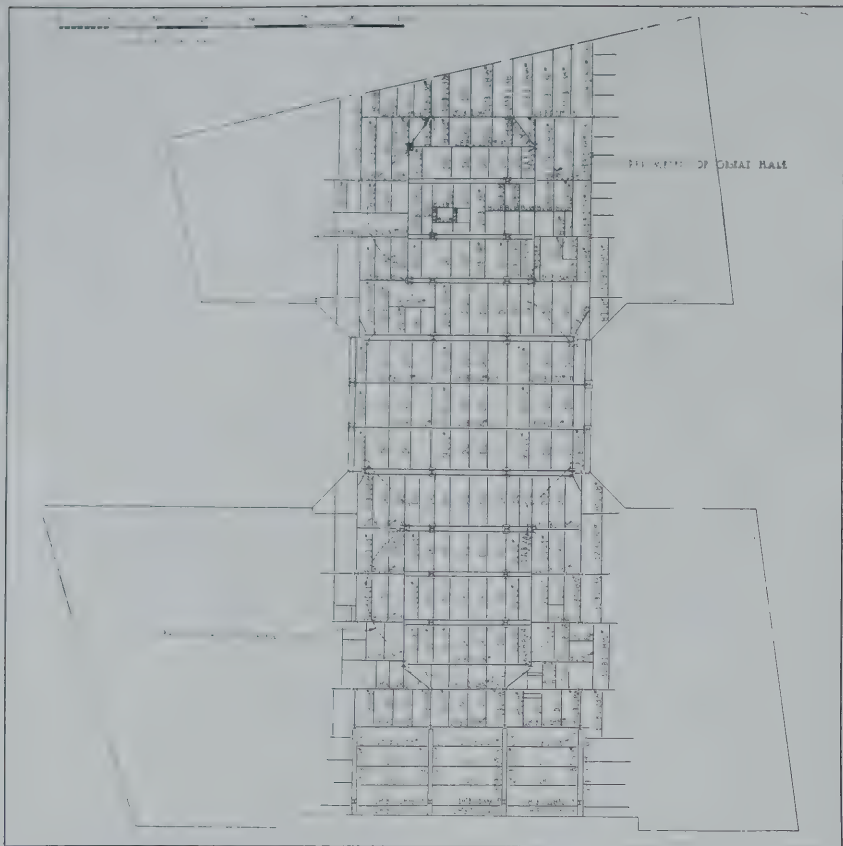
shown in Fig. 5. The groups of columns were braced by a system of vertical sway-bracing shown on the general plan (Fig. 3). This bracing was necessarily irregular in form and had to be placed in such positions as it could for architectural reasons. The total tonnage of steel in the subway girders, bracing and columns was 1,431 tons.

Referring to Fig. 7 of the 5th floor framing, showing the plan of the girders over the great hall, it will be seen that all the building columns coming down on this tier over the great hall had to be supported; for this purpose a system of double-plate girders was used, a pair of girders receiving 1 or 2 of the building columns as the case might be, with a heavy steel slab forming a bearing and distributing the load over the stiffeners of the girders. Two of these pairs were made up of girders of tremendous size and weight; the rivets used in fabrication were 1¼″ in diameter; the main material consisted of a web plate 120″ x ⅞″, the flange angles 8″ x 8″ x 1″, the side plates 12″ x 1″, and 4 cover plates on each flange 20″ x 1⅛″. The total span, center to center of bearings, was 64 feet.

An illustration of one of these girders loaded on the cars is shown by Fig. 6. The weight of each one of these individual girders was 60 tons, making the weight of a pair of supporting girders 120 tons. This illustration may give a clear idea of the large number of 1¼″ rivets used in fabricating the girder. It also shows the hitch angles which were used to lift the girder onto the cars and to raise it to its position in the building. The raising of these immense girders to a height of 74 feet above the street was quickly and safely accomplished by using two derricks, one lifting each end of a girder. The transportation of these pieces of steel through the streets was done on Saturday afternoons, Sundays and holidays, as the streets had to be comparatively clear to make it possible.

The 5th floor framing plan, Fig. 7, shows over the

120-inch Plate Girder for Fifth Floor of Cunard Building, Weighing 60 Tons (Fig. 6)

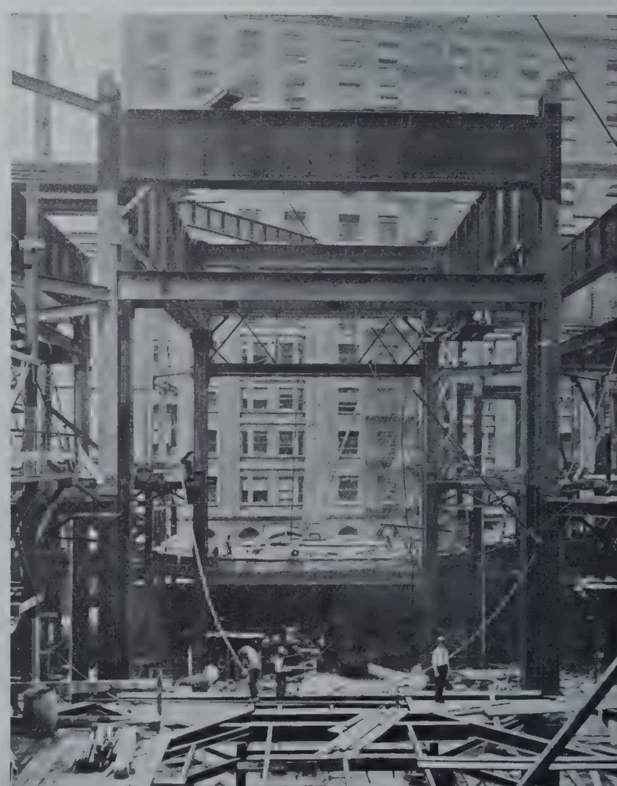


Portion of Fifth Floor Framing Plan over Great Hall (Fig. 7)

great hall area a number of other girders which were large and heavy but smaller than those just referred to. The riveting together of these at certain places required the use of $1\frac{1}{4}''$ rivets driven in the field; this is probably the first time this has been done in a building operation, and good results were obtained by driving with two riveting guns, one to drive and one to "buck up." Wind bracing was introduced in such places in the sides of the great hall as the architectural conditions permitted. This was considered good judgment in view of the large hole which was cut in the building and intended to keep the great hall structure rigid under wind or other vibration. The details throughout the whole building were made very stiff without resorting to extra bracing members.

The writer had the privilege of being associated with Boller & Hodge as Consulting Engineers for the structural work and with Daniel E. Moran as Consulting Engineer for the foundations. Henry W. Hodge worked with the writer up to the day of his death, and thereafter Howard C. Baird gave advice and co-operation. Thus were the many unusual problems solved.

Showing 120-inch Plate Girders in Place



Heavy Framing over 70 Feet above Street

Special Problems in Foundations of the Cunard Building

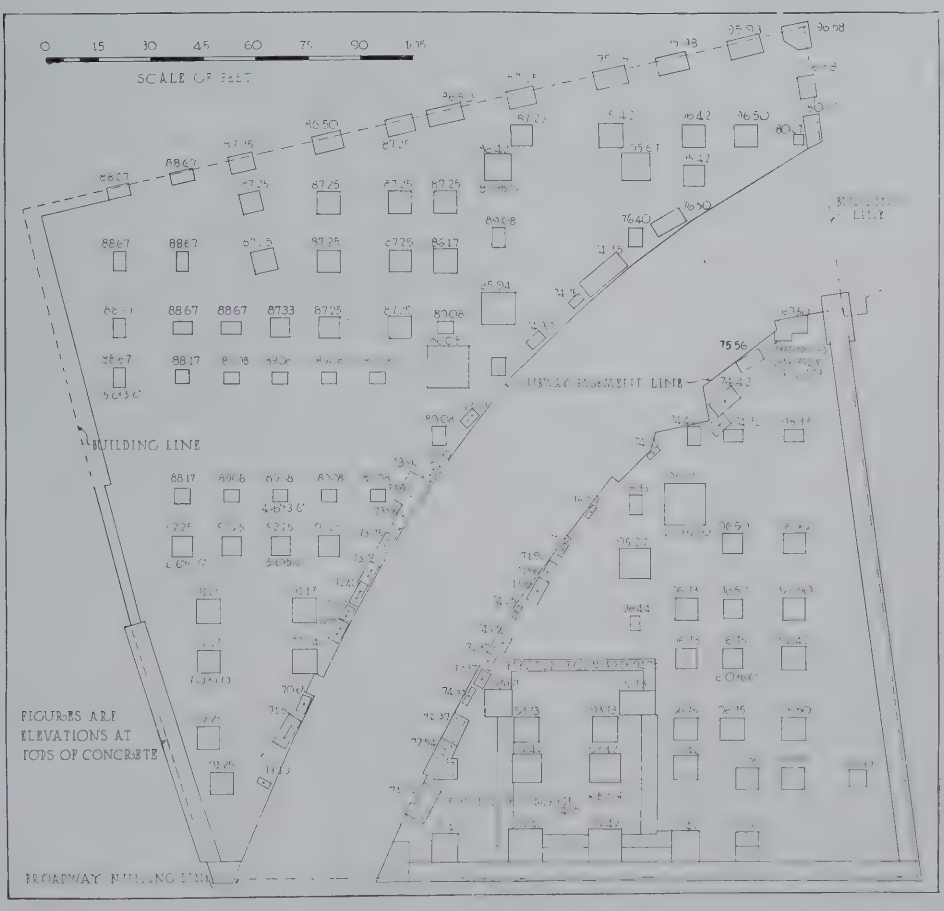
By CARLTON S. PROCTOR, C.E.
Moran, Maurice & Proctor, Consulting Engineers

IN the design of the foundations of the Cunard Building the engineers were confronted with the rather unusual feature of a site bounded on two sides by subway structures, with a third subway crossing diagonally. The topography of the rock surface showed a pronounced "hog back" running north and south at substantially the center of the site with a vertical drop averaging about 12 feet, the surface contours becoming rapidly higher to the west and lower to the east of this "hog back." This condition, together with the desire of precluding the possibility of subway vibrations affecting the building, and the underpinning of the diagonal subway at the southeast margin of the site, were other controlling features.

The walls and roof of the subway which crossed the site diagonally had been designed strong enough to carry column loads of any building which might probably be erected on the site, but although the column loads of the Cunard Building did not exceed the assumed loads in the design of the subway structure, it was found impracticable to dispose the column bases on the subway roof girders. Moreover, it was considered probable that if the columns of the building were placed directly on the subway girders vibrations would be transmitted to the building. It was therefore decided that the best results would be obtained by placing columns on each side of the subway structure and independent of it, these columns carrying trusses above the roof of the subway, which trusses in turn were to support the columns of the building in the desired arrangement.

The subway excavating having shattered the rock for some distance outside of the easement line, it was necessary to have the foundations of the adjacent columns of the building on undisturbed rock below the base of rail of the subway. Owing to the heavy loads on the trusses it was essential that the spans be the shortest possible, or, in other words, that the columns should be as near the lines of the subway as practicable. Had concrete piers been employed for the support of the bases of these columns, the centers of these piers, to give the required bearing area, would have been so far from the subway wall as to materially increase the lengths of the spans; therefore long and narrow grillages, with the long axes paralleling the line of the subway, were placed on the undisturbed rock below the level of the base of rail. This permitted the use of concentrically loaded areas of the required sizes with the minimum lengths of spans for the heavy trusses.

Owing to the weight of the building it was advisable to have the foundations on hardpan or on rock. As the rock surface at the westerly part of the building was above the required depth of the cellar, the foundations of this portion obviously had to be on the rock, and as it was considered preferable to have all the column footings on a uniform foundation bed, it was decided to have all foundations go to rock. The desired depth of cellar below ground



Foundation and Column Footing Plan of Cunard Building

water level required a cofferdam where the rock was low along the easterly and part of the northerly boundaries.

If an open cofferdam were employed the danger would be involved of losing material in sinkings through the existing stratum of New York quicksand, and a consequent settling of the Broadway subway would have resulted unless prevented by underpinning. This underpinning would have been necessary before the construction of the cofferdam had proceeded beyond the level of the base of rail.

In the opinion of the engineers it was deemed safe to sink pneumatic caissons without underpinning the subway on Broadway, and the subsequent construction supported this view, as no settlement whatever resulted. It was estimated that the saving in cost of omitting the underpinning would offset the increased cost of the pneumatic over the open method, and as the pneumatic method was considered safer it was adopted.

In the westerly portion of the site the rock surface was so high as to require a very considerable amount of rock excavation to meet the space requirements in the basement. On the other hand, the rock surface at the easterly side of the lot was below the sub-grade of the subway which crossed the site diagonally, and the underpinning of this subway near its intersection with the Broadway building line was necessary in order that the building column footings might go to undisturbed rock without endangering a settlement of the subway. This underpinning was done as a continuation of the Broadway cofferdam. The open method of construction was used for this work in lieu of the pneumatic, because, with the main cofferdam completed and supported, any run of material which might start in these small joints could be easily controlled and checked.

Furthermore, one of the columns adjacent to the subway occurred at the northerly joint, and it was necessary, as previously explained, to have this column close to the line of the subway and extending to firm rock, which at this location was considerably below the sub-grade of the subway. As the placing of this column would have been impracticable and expensive through the air-lock of a pneumatic joint, it was decided that this construction be done in the open, and by exercising due care no run of material resulted and a considerable saving in cost was effected.

The foundations of the Bowling Green Building, adjoining the site along the south side, are on rock to the west of the "hog back" previously referred to, and on hardpan east of that point. In order to build the adjoining foundations of the Cunard Building, it was necessary to underpin the north wall of the Bowling Green Building east of the "hog back," from the underside of footing to rock.

This was done by constructing a concrete wall 6 feet thick extending 2 feet under the Bowling Green Building. The wall was built in alternate short longitudinal sections, each section being thoroughly wedged to take the weight of the building before the next was started.

The finished wall then served the three purposes of underpinning, providing a foundation for the south wall columns of the Cunard Building, and closing the cofferdam.

Electrical, Heating and Ventilating Equipment
of the Cunard Building

By HENRY C. MEYER, JR.
Of Meyer, Strong & Jones, Inc., Mechanical and Electrical Engineers

ELECTRICITY for the Cunard Building is obtained from the New York Edison Company. A service connection extends to a switchboard in the basement which feeds three main riser shafts, with power feeders to the various banks of elevators, etc., and lighting feeders to the different floors.

There is nothing unusual in the equipment except in the manner of distribution, where an effort has been made to design a flexible system of wiring that could be modified from time to time to suit the varying demands of tenants with a minimum of expense and with a minimum of cutting. Owners of large office buildings are thoroughly familiar with the difficulty of making tenants' changes in the electrical equipment, and appreciate the importance of a flexible system of wiring.

Provision is made at each panel board, on rented floors, for the installation of meters. Panel boards on these floors are of the metering type which allow any circuit to be easily connected to any meter. Instead of the usual plan of having isolated branch circuits from panel boards to lighting outlets, plug receptacles, etc., a trunk system of conduits and junction boxes is used from which extensions are made to the various outlets. This arrangement is very flexible and considerably simplifies changes and extensions, and particularly simplifies the problem of metering where space is subdivided.

It often happens that a tenant requires an unusual amount of current at some one location, as for instance, to a large group of graphotype or addressograph machines, or for lighting a drafting room. With this system of conduits any such condition can be easily taken care of. The accompanying diagram shows a section of this trunk system with the conduits extended both to original outlets and to outlets which were added later to accommodate partitions that were not located in

accordance with the expected standard arrangement. Such extensions were made by installing each wire in a small flexible conduit buried in plaster. These extensions constitute a considerable improvement over the usual method employed.

Ceiling fixtures of the semi-indirect type are installed throughout the rented floors. They provide sufficient illumination and are so distributed that desk lights are unnecessary. A large number of plug receptacles are provided throughout the building for fans, adding machines, dictaphones, etc. A storage battery with charging apparatus is provided in the basement with wires leading up each of the riser shafts so that any tenant may obtain battery service for annunciators, push buttons, etc., without having the annoyance and expense of dry batteries. Conduits are also run up the various riser shafts and from the riser shafts to several points on each floor to facilitate the installation of telephone messenger calls, tickers and telegraph and similar wiring.

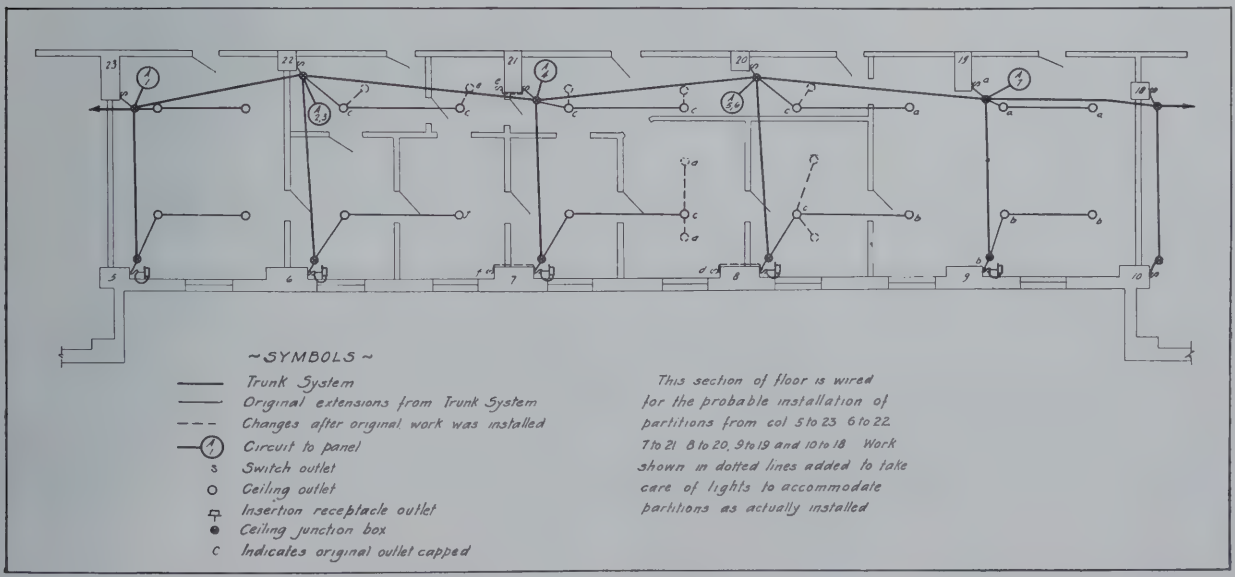
A network of conduits is provided in the floor of the quarters of the Cunard Company for connections to free standing desks, for telephones, etc. The telephones of the Cunard quarters are of the automatic type. Any instrument can be instantly connected with any other instrument without going through the switchboard, or an operator may be signaled from the same instrument and an outside number obtained in the usual way.

The Cunard Building is equipped with five horizontal tubular boilers of 175 h.p. each, furnishing steam for heating, and one boiler of the same type of about 80 h.p. that is used to furnish hot water for summer and winter use. The boilers are set with shells 6′6″ above the floor so that stokers may be installed at any time in the future. The boilers are provided with forced draft for use in emergency, should one boiler be shut down for repairs or cleaning, or when burning finer sizes of low grade anthracite coal. The coal bunker is of about 700 tons capacity, and is filled by means of a conveying belt system. Arrangements are made for the installation of a crusher and of a fuel oil system should it be desirable to install them.

The building is heated entirely by direct radiation and the vacuum system is employed. The total amount of radiation in the building is about 65,000 square feet. The radiators are bracketed to the walls in almost every instance so as to make it easy to clean beneath them. About 150 radiators are concealed, and automatic control is used to a considerable extent in the steamship company's offices.

There are eight separate ventilating systems in the building: one ventilating the mechanical plant in the sub-basement; a second ventilating the Cunard quarters in the basement and first floors, including the freight and passenger departments; a third ventilating the Cunard quarters in the second and third floors; a fourth ventilating the Mechanics and Metals National Bank quarters on the basement, first and second floors; a fifth supplies to the vaults in the basement and sub-basement, and three systems ventilate all the toilet and locker rooms throughout the building.

Each coupon room in connection with the safe deposit vault is provided with an independent supply inlet with exhaust outlets in the corridors, and a supply and exhaust is also provided for the main vault, the connection for it consisting of movable aluminum ducts entering the emergency door and so arranged that they can be swung out of the way when the door is to be closed. The air is supplied to the vault near the floor through registers in the base beneath the boxes, and it is exhausted through ceiling registers. The total amount of air moved by the ventilating equipment is about 315,000 cubic feet per minute and about 400,000 pounds of sheet metal work were used in the system.



Section of Floor Plan Showing Flexible System of Electric Wiring

Plumbing in the Cunard Building

By CLYDE R. PLACE
Consulting Mechanical and Sanitary Engineer

IN planning the Cunard Building the plumbing layout and specifications were given special attention and were prepared in the office of the consulting engineer. All fixtures necessary for an up-to-date plumbing installation were given careful consideration as to design and operating efficiency, combined with simplicity. The care in developing the plumbing plans was evident as the building progressed, because the materials and fixtures arrived early and correctly and were placed in their proper positions without delays.

The question of temporary water supply and fire protection for a building of this size while under construction is an important factor. In addition to supplies to meet construction requirements, temporary school sinks, which are a sanitary necessity for the use of the mechanics, were installed. Many unusual difficulties were experienced in the layout of pipes, due to the many levels and clearances occasioned by the subway loop under the building, as may be seen from an examination of the sub-basement plan. An ample water supply enters from the three streets bordering the property. These supplies are combined into a common header and carried to a large steel suction tank of 10,000 gallons capacity with two compartments.

The house and fire pumps were tested under actual working conditions before being shipped to the site. These pumps were installed early enough to permit their being used for the building construction, which resulted in a saving. The pipe for the cold water service is of standard and extra strong quality of wrought iron and is galvanized. The hot water pipe is brass throughout. The system of hot water circulation is overhead down feed. Expansion and contraction of the various pipes were carefully considered, and hot water can instantly be obtained at any fixture in the building.

The water heaters for the fixtures of the building requiring hot water, such as slop sinks, office and toilet basins, shower baths, etc., are of the storage type. There are three heaters, each of 3,000 gallons per hour capacity, and the piping is so arranged that any one heater may be shut down as may be required in case of emergency. There are two house tanks on the roof, each of 10,000 gallons capacity and the fire protection reserve of 3,500 gallons is maintained in each tank. The supply to all the fixtures in the building above the first floor is on the tank supply. The fixtures below the first floor are on street pressure with a cross connection on the supply from the house tanks.

Because of the excessive pressure on the water lines, due to the height of the building, pressure-reducing valves are used on the supplies below the 14th story. This method gives a uniform pressure at all fixtures. Each fixture has its individual valve control and in addition each group has a separate valve. The valves throughout the building are accessible by means of metal doors. There are 1,700 plumbing fixtures installed in the building and each fixture was inspected as to quality and approved before being shipped to the site.

While all the fixtures above grade flow by gravity to the public sewer, the waste from fixtures in the basement and sub-basement is carried to two ejectors which are discharged by compressed air. Each ejector has a capacity of 150 gallons per minute, discharged into the public sewer in Greenwich street. Sump pumps for handling the ground water and wastes of various drips are arranged in duplex outfits.

Electrical apparatus is so arranged that either one or both of the house pumps, the sump pumps or the compressors may work at the same time. The second pump is started when the load on the first is more than it can handle. The passenger elevators are of the high speed, overhead gearless traction type. They are divided into three separate banks for express and local service, thereby giving flexibility and quickness of operation. The local elevators serve up to and including the 14th floor and the express elevators from the 12th to 21st floors. The Cunard offices and the bank quarters have short rise elevators for their own service. These are of the geared traction type.

The starter for each bank of passenger elevators has complete control at all times over the elevators. An electric board, with buttons thereon, enables him to start, call back and cut out the signals, and by means of telephone he can call up any elevator operator, engineer or superintendent of the building. The shaftway doors are of the center-opening type with hand-operated, two-thirds vertical bar locks and center catches. Very heavy adjustable rubber bumpers eliminate the noise of opening and closing the doors. These doors are also equipped with a mechanism to prevent a person trying to force the door open, once the operator has started to close it. The elevators operating over the subway loop have safeties on the counterweights in addition to those on the cabs. The cabs are of such platform sizes as to insure very quick loading and unloading of the passengers.

The passenger elevators in the building provide for a floor get-away every 23 seconds and there are elevators in sufficient number to empty the building during the peak rush hours without undue congestion at any of the floors. The position of the operator in the cab is the same for all cases. He operates doors with left hand and car control with his right hand. This method provides for a quick and satisfactory change of operators.

SALOON PASSENGERS' LOUNGE

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

WINDOW IN SALOON PASSENGERS' LOUNGE

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

BOARD OF DIRECTORS' ROOM

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

OFFICE OF ASSOCIATE DIRECTOR

OFFICE OF DIRECTOR AND GENERAL AGENT

CUNARD BUILDING, BOWLING GREEN, NEW YORK, N. Y.

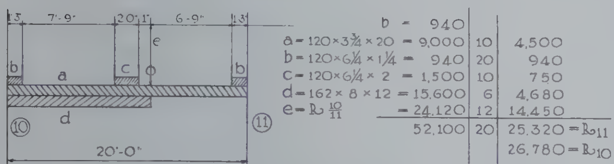
BENJAMIN WISTAR MORRIS, ARCHITECT, CARRERE & HASTINGS, CONSULTING ARCHITECTS

Steel Design for Buildings

PART I. THE DESIGN OF STEEL BEAMS

By CHARLES L. SHEDD, C.E.

IN making engineering calculations, it is important that they should be made systematically; the speed of the work will be increased, accuracy assured, and the calculations made available for reference afterwards by anyone familiar with the system. The method here described is based on that used by Purdy & Henderson, Engineers, of New York, but has been modified in some respects by the author where it seemed advisable for speed and accuracy. The design tables are taken from the Carnegie and Bethlehem Handbooks but are rearranged



Sketch for Example of Applying Calculations

by the author to give a system whereby the lightest beam may be readily chosen to fulfill any required conditions. The moments of resistance and allowable shear are copied directly from the handbooks mentioned, but the buckling is the allowable per lineal inch instead of per square inch as given in the Carnegie Handbook. The buckling for the Bethlehem beams is computed by the same formula as used by the Carnegie Handbook in order to give a uniform table.

The computation is shown here for a beam in a large office building, recently designed by the author, and will illustrate the method of arranging the computations. It is a spandrel beam, that is a beam between two outside columns of the building, carrying wall and floor loads. The beam is between columns 10 and 11 as shown in the sketch. The wall is of brick, 12″ thick with two windows, each 7′9″ wide, as shown in the sketch, and separated by a brick pier 2′0″ wide. The story height is 10′0″ and the height of each window is 6′3″.

These figures are scaled from the drawings to the nearest 3″, which is near enough to give accurate results. By accurate results is meant consistent accuracy. That is, if some factor of the computations cannot be ascertained nearer than 5% it is a waste of time to try to get other factors much nearer, for the result cannot be more accurate than the least accurate factor. Usually the least accurate factor in such calculations is the live load of the floor. This, while determined definitely by law in most large cities, is not actually very close to the truth, as being a variable it must be sure to err on the safe side. Then, too, the actual strengths of the beams vary slightly. This is shown by the range allowed in any specification for the results of the test pieces. The American Society for Testing Materials, for instance, allows in its specifications as given in the Carnegie Handbook an allowable variation for the tensile strength of steel between 55,000 and 65,000 pounds per square inch. This is a variation of about 18%.

The span of the beam is 20′0″, as shown in the sketch. The uniformly distributed loads are shown by crosshatched areas while the concentrated load, *e*, is located by an arrow. The load, *a*, is the uniform load of brickwork under the windows, extending the entire length of the beam. It is 3′9″ high and 12″ thick. Brickwork is usually taken to weigh 115 pounds per cubic foot, but the author uses 120 pounds and neglects the weight of the plaster and the windows themselves. This is sufficiently accurate and is easy to use as it gives just 10 pounds for each inch of thickness of wall. These computations are shown in detail alongside of the beam diagram.

The *b* and *c* loads are the pier loads between the windows. Note that there are two *b* loads. In writing out these expressions for wall loads the author usually gives the load per superficial foot first, the height next and the length last. This is for simplicity in extending the figures. Using a slide rule it is best to use first the number which is common to most expressions, and the special figures last to avoid moving the slide too much, thus saving time. In this case, notice that 120 occurs in three of the expressions, and that 6¼ occurs twice.

The *d* load is a uniform floor load applied to the beam from column 10 to the point where a floor beam frames into it at *e*. 162 pounds is the load per square foot, including both the dead and live. The figures 8 and 12 in the computation are in feet. The first, 8, is half the span of the floor slab and the second, 12, is the length of the loading. The load *e*

TABLE I. ECONOMIC TABLE OF BEAMS AND CHANNELS

SHOWING MOMENT OF RESISTANCE, ALLOWABLE SHEAR AND BUCKLING PER LINEAL INCH

Sect.	*Wt.*	*Mom.*	*Shear*	*Buc.*	*Sect.*	*Wt.*	*Mom.*	*Shear*	*Buc.*	*Sect.*	*Wt.*	*Mom.*	*Shear*	*Buc.*
3″ [	4#	1.4	5.1	2.7	9″ BI	24	27.3	32.8	5.3	18″ I	60	124.7	99.9	7.4
3″ [	5	1.6	7.9	4.5	9″ [	25	20.9	55.3	9.8	21″ I	60½	156.9	89.8	4.5
4″ [	5¼	2.5	7.2	2.7	9″ I	25	27.2	36.5	6.2	15″ BI	64	118.2	90.7	8.7
3″ I	5½	2.2	5.1	2.7	10″ [	25	24.2	52.9	8.3	20″ BI	64	162.9	90.0	5.2
3″ [	6	1.8	10.8	6.3	10″ I	25	32.5	31.0	4.1	15″ I	65	113.1	102.9	10.4
4″ [	6¼	2.7	10.1	4.1	12″ [	25	32.0	46.8	5.3	18″ I	65	130.6	114.7	9.0
3″ I	6½	2.3	7.9	4.4	8″ I	25½	22.8	43.3	8.6	20″ I	65	155.9	100.0	6.0
5″ [	6½	3.9	9.5	2.7	12″ I	28	44.2	34.0	3.3	20″ BI	69	169.2	104.0	6.3
4″ [	7¼	3.0	13.0	5.4	10″ BI	28½	35.9	39.0	5.6	24″ I	69½	214.2	93.6	3.2
3″ I	7½	2.5	10.8	6.3	12″ BI	28½	48.0	30.0	2.7	15″ I	70	118.0	117.6	12.3
4″ I	7½	3.9	7.6	2.9	9″ I	30	30.2	51.2	9.1	18″ I	70	136.5	129.4	10.5
6″ [	8	5.7	12.0	2.7	10″ [	30	27.5	67.6	10.8	20″ I	70	162.6	115.0	7.4
4″ I	8½	4.2	10.5	4.3	10″ I	30	35.8	45.5	6.9	12″ BG	70	119.7	55.2	6.7
5″ [	9	4.7	16.5	5.4	12″ [	30	35.9	61.5	7.6	15″ BI	71	141.5	78.0	7.2
4″ I	9½	4.5	13.5	5.4	12″ I	31½	47.9	42.0	4.5	20″ BI	72	195.5	86.0	4.7
5″ I	9¾	6.4	10.5	3.1	12″ BI	32	50.8	40.2	4.2	15″ BG	73	157.1	64.5	5.5
7″ [	9¾	8.0	14.7	2.8	8″ BG	32½	38.1	23.2	4.1	15″ I	75	122.9	132.3	14.1
4″ I	10½	4.7	16.4	6.6	15″ [	33	55.6	60.0	5.0	18″ I	75	169.1	101.1	7.5
6″ [	10½	6.7	19.1	5.0	9″ I	35	33.1	65.9	11.7	20″ I	75	169.2	129.8	8.8
8″ [	11¼	10.8	17.6	2.8	10″ [	35	30.8	82.3	13.2	18″ I	80	174.9	115.9	9.1
5″ [	11½	5.5	23.8	8.2	10″ I	35	39.0	60.2	9.6	20″ I	80	195.5	120.0	7.9
5″ I	12¼	7.2	17.8	5.9	12″ [	35	39.8	76.3	10.0	24″ I	80	231.9	120.0	5.3
6″ I	12¼	9.7	13.8	3.3	12″ I	35	50.7	52.3	6.2	20″ BI	82	208.0	114.0	7.3
7″ [	12¼	9.2	22.2	4.8	15″ [	35	56.9	63.9	5.5	24″ BI	84	264.6	110.1	4.6
6″ [	13	7.7	26.4	7.0	12″ BI	36	59.8	37.2	3.8	18″ I	85	180.8	130.5	10.6
9″ [	13¼	14.0	20.7	2.8	15″ I	37½	72.1	49.8	3.7	20″ I	85	201.1	132.6	9.1
8″ [	13¾	12.0	24.5	4.4	9″ BG	38	50.6	27.0	4.1	24″ I	85	240.9	136.8	6.7
5″ I	14¾	8.1	25.2	8.1	15″ BI	38	78.7	43.5	2.6	18″ I	90	186.7	145.2	12.2
6″ I	14¾	10.6	21.1	5.6	10″ I	40	42.3	74.9	12.0	27″ I	90	292.1	141.4	5.3
7″ [	14¾	10.3	29.6	6.8	12″ [	40	43.7	90.9	12.1	20″ I	90	207.7	147.4	10.5
7″ I	15	13.8	17.5	3.5	12″ I	40	59.8	55.2	6.7	24″ I	90	248.7	151.4	7.8
9″ [	15	15.1	25.9	3.9	15″ [	40	61.8	78.6	7.4	26″ BI	90	305.3	119.8	4.2
10″ [	15	17.8	24.0	2.8	15″ BI	41	81.2	51.0	3.8	18″ BG	92	235.7	86.3	6.1
6″ [	15½	8.7	33.8	9.0	15″ I	42	78.5	61.5	5.2	20″ I	95	214.2	162.0	11.9
8″ [	16¼	13.3	31.9	6.2	10″ BG	44	65.1	31.0	4.1	24″ I	95	256.5	166.3	9.0
6″ I	17¼	11.6	28.5	7.6	12″ I	45	63.5	69.1	8.9	20″ I	100	220.7	176.8	13.3
7″ [	17¼	11.5	37.0	8.4	15″ [	45	66.7	93.3	9.2	24″ I	100	264.4	180.9	10.1
7″ I	17½	14.9	24.7	5.5	15″ I	45	81.0	69.0	6.1	15″ BG	104	216.9	90.0	8.7
8″ I	17½	19.4	17.6	2.8	15″ BI	46	86.2	66.0	5.7	24″ I	105	312.4	150.0	7.7
8″ BI	17½	19.1	20.0	3.3	18″ I	48	109.2	68.4	4.1	28″ BI	105	382.3	140.0	4.5
8″ I	18	18.9	21.6	3.7	18″ BI	48½	118.2	57.6	3.0	24″ I	110	320.4	165.1	8.9
8″ [	18¾	14.6	39.2	7.8	12″ I	50	67.4	83.9	11.2	20″ BG	112	312.3	110.0	6.9
8″ BI	19½	20.2	26.0	4.7	15″ I	50	85.9	83.7	8.0	24″ I	115	328.4	180.0	10.1
7″ [	19¾	12.6	44.3	10.1	15″ [	50	71.6	108.0	11.1	24″ BG	120	400.8	127.0	5.8
7″ I	20	16.1	32.1	7.3	18″ BI	52	122.2	67.6	4.0	30″ BI	120	465.7	162.0	4.9
9″ [	20	18.0	40.7	7.0	15″ BI	54	108.4	61.5	5.1	15″ BG	140	283.1	120.0	12.5
10″ [	20	21.0	38.2	5.5	18″ BI	54	124.7	73.9	4.7	20″ BG	140	391.3	128.0	8.6
9″ BI	20	25.2	22.5	3.1	12″ I	55	71.3	98.5	13.1	24″ BG	140	466.8	144.0	7.2
8″ I	20½	20.2	28.5	5.4	15″ [	55	76.5	122.7	13.0	26″ BG	150	528.6	163.5	7.7
12″ [	20½	28.5	33.6	3.2	15″ I	55	90.8	98.4	9.8	26″ BG	160	576.5	163.5	7.3
9″ I	21	25.1	26.1	3.9	18″ I	55	117.8	82.8	5.6	28″ BG	165	625.0	185.0	7.5
8″ [	21¼	15.9	46.5	9.3	12″ BG	55	96.0	44.5	4.8	28″ BG	180	691.9	193.0	8.1
10″ I	22¼	30.2	25.2	3.0	18″ BI	59	130.8	89.0	6.4	30″ BG	180	728.4	206.6	7.7
8″ I	23	21.5	35.9	7.1	20″ BI	59	156.3	75.0	3.7	30″ BG	200	813.4	225.0	8.8
10″ BI	23½	32.8	25.0	3.0	15″ I	60	108.3	88.5	8.6					

is brought in by an interior beam framing into the beam in question at the end of the *d* load. The reaction is copied directly from the calculations for this building where it is labeled R^{10}_{11}, denoting that that end of the beam frames into a beam between columns 10 and 11. These expressions are extended and placed below each other so that they can be readily added together, and as there are two *b* loads it is repeated at the top so that when they are added up the result, 52,100, will be the total load on the beam.

In the computation, between the two vertical lines at the right of these loads are placed the respective distances from the left hand reaction to the center of gravity of each load, and below the horizontal line the span of the beam. The numbers at the right of the second vertical line are the parts of each load which are carried to the right hand reaction. For instance, 15,600 divided by 20 and multiplied by 6 gives 4,680. Added together, the total 25,320 is the reaction at column 11, and this subtracted from the total load shows the reaction at column 10. This method also allows the decimal point to be found easily by inspection, thus avoiding errors.

The maximum moment on the beam is at the

point of zero shear, that is where the algebraic sum of all the forces (loads and reaction) to either side of the section is zero. This can often be told very closely by inspection and verified by figures. In this case the load *e* is very nearly as large as either of the reactions which are about the same size. It therefore looks as if the zero shear were at the load *e*. The portion of the *a* load to the right of the *e* load is equal to 120x3¾x8, which is equal to 3,600 and which added to *b* gives 4,540, and this subtracted from R_{11} gives 20,780, which is less than *e*, therefore the zero shear is at that load. The expression for the moment is written out, first the reaction times its arm and then the uniform loading times its arm (4), and then the load *b* times its arm. These are extended and the results placed below each expression. The negative amounts are added together and their sum, 21,300, placed below the moment of the reaction. The difference between these, or the moment we are after, is then obtained, 180,700.

In a large office it is best for one man to write out the expressions with the sketch and hand it to a less experienced man who uses his slide rule until he finds the reaction. Another inexperienced man can check his work and return it to the first man who writes in the expression for the moment, and the other two men then extend this expression and return it to the designer who chooses the section to be used.

In choosing the section, Table I should be used. It will be noted that the weights of the beams all appear in order, therefore if the designer starts at the first of the table and examines the properties of each beam the first one he finds which fulfills the requirements is the lightest and therefore the most economical. In choosing a beam it is best to follow down the moment column. This gives the allowable moment in foot-pounds, the same as used in the calculations. The last two ciphers have been omitted. For this beam we require a moment of resistance of 180,700, and the first one we come to is the 24″ I 69 ½#, which has a moment of resistance of 214,200. The maximum shear on the beam is 26,780, while the beam is good for 93,600. The buckling need not be considered in this beam, but if one of the loads like the *e* load had been applied to the top of the beam, as in the case of a strut, then we should have had to use the last column of the table.

If the *e* load had been a strut load we would have to compute the necessary length of beam to use in distributing the load so as not to buckle the web in compression. The load must be distributed over a length not greater than half the depth of the beam plus the length on the top flange where the load is applied. To find this necessary length we must divide the load 24,120 by the amount in the table, 3,200, which gives 7½″ and from this subtract half the depth of the beam, 12″, but as this gives a negative result there can be no trouble. If it had been a larger load, say 109,000, we would have secured by dividing that by 3,200, 34″ and after subtracting half the depth of the beam, 12″, would have had 22″ left. If the strut had been composed of two 6″x4″x½″ Ls, for instance, with the 6-inch legs together and parallel to the web of the beam, we would have had either to put a base on the strut which would have distributed the load along the whole 22″, or used stiffener angles on the web of the beam.

Some designers prefer to use an I beam and channel to carry a wall. In such cases a table such as Table II will prove useful.

TABLE II

ECONOMIC TABLE OF AN I BEAM AND CHANNEL BEAM SECTION

Section		*Wt.*	*Mom.*
6″ I 12¼#	6″ [8#	20¼	15.4
7″ I 15	7″ [9¾	24¾	21.8
8″ I 18	8″ [11¼	29¼	29.7
9″ I 21	9″ [13¼	34¼	39.1
10″ I 25	10″ [15	40	50.4
do	10″ [20	45	53.5
12″ I 31½	12″ [20½	52	76.4
do	12″ [25	56½	79.9
12″ I 40	12″ [20½	60½	88.2
do	12″ [25	65	91.7
do	12″ [30	70	95.6
15″ I 42	15″ [33	75	134.1
15″ I 45	do	78	136.5
15″ I 50	do	83	141.4
15″ I 55	do	88	146.3
15″ I 60	do	93	163.8
do	15″ [35	95	165.1
do	15″ [40	100	170.0
do	15″ [45	105	174.9
do	15″ [50	110	179.8
do	15″ [55	115	184.7
15″ I 65	do	120	189.5
15″ I 70	do	125	194.4
15″ I 75	do	130	199.3

It is sometimes desirable to design beams with flange plates. This is occasionally done to save in the depth of the member, sometimes to provide a wider bearing for brickwork, and sometimes to reinforce beams already in place. Table III will show the values of a few of such beams in bending. Only the more common sizes have been included.

TABLE III

MOMENTS OF RESISTANCE OF BEAMS WITH FLANGE PLATES. ¾″ RIVETS STAGGERED

Sect.	*Net*	*b*	*t*=5-16	3-8	7-16	1-2	9-16	5-8	11-16	3-4
6″ I 12¼	7.6	4	14.6	16.2	17.7	19.3	20.9	22.4	24.0	25.6
		+1	2.5	3.0	3.6	4.1	4.6	5.2	5.7	6.2
7″ I 15	11.1	4	19.3	21.1	22.9	24.7	26.5	28.2	30.0	31.8
		+1	3.0	3.6	4.2	4.8	5.4	6.1	6.7	7.3
8″ I 18	15.5	5	28.2	30.9	33.6	36.3	39.0	41.7	44.4	47.1
		+1	3.3	4.0	4.7	5.4	6.1	6.8	7.5	8.2
9″ I 21	21.0	5	35.2	38.1	41.0	43.9	46.8	49.7	52.7	55.6
		+1	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.0
10″ I 25	27.6	5	43.2	46.4	49.6	52.8	56.0	59.2	62.4	65.6
		+1	4.1	4.9	5.8	6.6	7.5	8.3	9.2	10.0
12″ I 31½	41.3	6	64.8	69.6	74.4	79.3	84.1	88.9	93.7	98.5
40	52.7	6	75.7	80.4	85.1	89.9	94.6	99.3	104.0	108.7
		+1	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
15″ I 42	68.5	8	110.0	118.5	127.1	135.6	144.2	152.7	161.3	169.8
60	95.6	8	136.0	144.3	152.7	161.0	169.4	177.7	186.1	194.4
		+1	6.2	7.4	8.7	9.9	11.2	12.4	13.7	14.9
18″ I 55	104.5	8	154.8	164.9	174.9	185.0	195.1	205.1	215.2	225.2
		+1	7.5	9.0	10.6	12.0	13.6	15.0	16.6	18.0
20″ I 65	139.3	8	195.0	206.1	217.2	228.3	239.4	250.5	261.6	272.7
80	176.8	8	231.0	241.9	252.8	263.7	274.6	285.5	296.3	307.2
		+1	8.4	10.1	11.7	13.4	15.1	16.8	18.4	20.1
24″ I 80	210.0	8	276.1	289.5	302.8	316.2	329.5	342.9	356.2	369.6
100	242.5	8	307.3	320.5	333.6	346.8	360.0	373.2	386.3	399.5
115	299.8	8	363.1	376.0	389.0	401.9	414.8	427.7	440.7	453.6
		+1	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0

For example, in this table an 18″ I 55# with two 8″x½″ plates, one on top and one on the bottom, would be good for a bending moment of 185,000 foot-pounds. If the plates were changed to 9″ plates the moment of resistance would be increased by 12,000 foot-pounds, making 197,000 foot-pounds. The plates need not go the full length of the beam but could stop at a point where the moment was 104,500 foot-pounds as in the column headed "Net."

It is best to put in as many rivets near the ends of each plate as are required to develop the full strength. These should be staggered and spaced about 3″ c.c. Between these two groups the rivets should be spaced not over 6″ c.c. In 6″ and 7″ beams the rivets should not be greater than ⅝″ in diameter, but in larger beams they can be ¾″ in diameter. Table IIIa, below, gives the number of rivets necessary to develop the various sized plates. For example, a 7″x½″ plate would require 17 ⅝″ rivets or 12 ¾″ rivets.

TABLE IIIa

NUMBER OF RIVETS REQUIRED TO DEVELOP FLANGE PLATES FOR BEAMS WITH RIVETS STAGGERED

	Diam. Rivet = ⅝″				¾″							
t	*b* = 4″	5″	6″	7″	5″	6″	7″	8″	9″	10″	11″	12″
5–16	6	7	9	11	5	6	7	8	10	11	12	13
3–8	7	9	11	13	6	7	9	10	11	13	14	16
7–16	8	10	12	15	7	9	10	12	13	15	16	18
1–2	9	11	14	17	8	10	12	13	15	17	19	21
9–16	10	13	16	19	9	11	13	15	17	19	21	23
5–8	11	14	18	21	10	12	14	17	19	21	23	26
11–16	12	16	19	23	11	13	16	18	21	23	26	28
3–4	13	17	21	25	12	14	17	20	22	25	28	31

Where the beam is quite short and there is difficulty in getting the rivets in near enough to the ends of the plates, the rivets may be spaced closer together than 3″ or the plates may be made longer than necessary for the moment. It is best to get in a sufficient number of rivets at each end of each plate to develop it in at least as short a distance as one-quarter the length of the plate. Special cases may be investigated by computing the required pitch of the rivets from the formula: $p = \frac{vi}{sq}$ in which v equals the value of a rivet in single shear, i the moment of inertia of the entire section, q the statical moment of one plate about the center of the beam, and s the shear on the beam at the point considered. The value of a ¾″ machine-driven rivet in single shear is 4,420 and of a ⅝″ rivet 3,070. The moment of inertia of the entire section may be obtained by multiplying the moment of resistance in Table III by 12 times the depth of the beam, including the plates, and dividing it by 32,000. The statical moment of a plate is its net area multiplied by half the depth of the I beam plus half the thickness of one plate.

The minimum spacing for rivets, so as not to impair the strength of the plate, is 2¹⁄₁₆″ for 6″ beams, 2³⁄₁₆″ for 7″ and 8″ beams, 2¼″ for 9″ beams, 2⅜″ for 10″ beams, 2⁷⁄₁₆″ for 12″ beams, 2⁹⁄₁₆″ for 15″ beams, 2¹¹⁄₁₆″ for 18″ beams and 2¹³⁄₁₆″ for larger beams. This is determined by the gauge of the beams.

To illustrate the design of a beam with flange plates, let us consider the beam computed at the first of this article, between columns 10 and 11. It had a bending moment of 180,700 foot-pounds, therefore we could use a 15″ I 60# with 2 8x¹¹⁄₁₆ plates, which according to Table III is good for 186,100 foot-pounds. From Table I we find that a 15″ I 60# beam is good for a shear of 88,500 pounds, which is more than ample. The value of the net section of the I beam would be 95,600, from Table III. The moment 4 feet from column 11 would be equal to $4R_{11}$—120x3¾x4x2—3⅜b = 94,200, which would be very nearly equal to the net value of the beam. The moment 4′3″ from column 10 would equal 4¼R_{10}—120x3¾x4¼x2⅛—162x8x4¼x2⅛—3⅝b = 95,000, which would also be about equal to the value of the net section of the beam. This gives the two points at which the plates may be cut off. The shear at the first point would be R_{11}—120x3¾x4—b = 22,580 and at the second point would be R_{10}—120x3¾x4¼—162x8x4¼—b = 18,430. From Table IIIa we find that 18 ¾″ rivets would be necessary to develop the full strength of one plate. If they were spaced 3″ c.c. they would occupy 4′6″. If we take the 4′0″ and 4′3″ which we found for the cut-offs of the plates and subtracted from the length of the beam 20′0″, we would get 11′9″ and

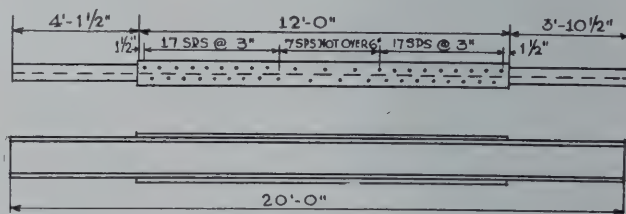


Fig. 1

adding 3″ for the two edge distances of the rivets would get 12′0″ for the length of each plate. The 4′6″ is more than one-quarter of this length, so we had better investigate accurately the required rivet pitch.

The moment of inertia $i = \frac{186{,}100 \times 12 \times 16.38}{32{,}000} = 1{,}140$

$q = 7.12 \times .69 \times 7.85 = 38.6$

$p = \frac{4{,}420 \times 1{,}140}{22{,}580 \times 38.6} = 5.8''$

which is more than the 3″, therefore it is all right to use the 3″. Fig. 1 shows the completed design of the beam.

Modern Floor Coverings

PART I

By E. H. HOWARD

IT IS interesting to note, with the development of building conditions, how various materials, as they are adopted for general use, pave the way for improvements in still different fields. This is evident in practically every branch of construction. For example, deformed bars and rods were not considered usable until the time when concrete became a commercial product. With the development of plaster work came wire and metal lath with their many modifications and suitability for use as reinforcing material for concrete construction.

It is indeed difficult to keep pace with all the materials which are continually appearing on the market, and to know the real merits of each product as distinguished from the claims set forth by the manufacturer, for there is sometimes a wide difference between the actual merits and the advertised merits of many materials. Another important matter is the ability required of the architect in determining and using the material suitable for special conditions. For example, there are some locations throughout the country where soft brass piping cannot be used for cold water. There is but little question but that brass piping is preferable in the majority of instances to any other kind of pipe for both hot and cold water, but the character of the material used must be adapted to local conditions.

Manufacturers of materials used for floor coverings have been extremely successful during recent years in developing new products, and these new materials are particularly to be noted in considering their adaptability to various uses. The typical floors of wood, such as maple, oak, birch or beech have changed but little since first adopted. From the "square-edged" days, wood floors have undergone a change to the use of narrow faced, tongued and grooved, and end matched, together with the use of varying thicknesses of wood, but in other types of floor, such as those of composite materials, we find radical differences and variety of developments in the field of covering materials, which formerly meant wood or marble.

About 35 years ago thin oilcloth for floor covering was placed upon the market. This came in yard and two-yard widths and was used particularly for covering kitchen floors. The English oilcloth very soon came into the market and appeared in 24-foot widths, making it possible to cover almost any room in one piece. It was used very generally, even on the best work, and floors of many office buildings during that period were covered with this material.

Gradually from the manufacture of this oilcloth the idea of linoleum was evolved. At first it was very thin and looked like oilcloth and had designs printed in the same general way and came in 8/4 or 6-foot widths. Later these widths were increased to 16/4 or 12-foot, and also appeared in several grades and thicknesses up to and including ⅛-inch. From the manufacture of this material the inlaid or tile linoleum was devised in 8/4 widths with the same various thicknesses, the color and design extending entirely through to the fabric or backing.

Cork carpet was very little used up to 15 years ago, but since that time has found an extensive market. It varies in thickness from ¼ to ½ inch, and on account of its elastic, resilient construction is exceedingly well adapted for many places where linoleum could not so well be used. Cork carpeting is practically noiseless; it is a little softer and less dense in composition than linoleum, and has been used in a great many installations of varying types with satisfaction. It is especially adapted for floors of large office buildings, auditoriums, churches and similar edifices. The places where cork carpet is to be used should be selected with considerable care, because the porous construction of the material itself renders it unadaptable for such places as kitchens where grease and stains may easily get on the floor. Unlike linoleum, cork carpet cannot be either waxed or stained, as such treatment immediately destroys its value.

When linoleum is applied to wood or concrete floors it should always be cemented with liquid cement. The type of this cement varies with the workman who is applying it. Some architects specify linoleum to be applied with waterproof cement; others simply specify a cement. Whenever the government uses the linoleum known and specified as the U. S. Standard Battleship Linoleum on ships, it is put down with waterproof cement. This is principally because it frequently comes in contact with moisture, and also because it is applied to an iron deck.

Experience proves that the best results in laying linoleum are obtained when a quick-drying cement, properly applied, has been the adhesive medium. Waterproof cement undergoes a chemical action when applied to concrete. Unless sufficient time is allowed for the evaporation of the volatile content, gases will form which cause puffs or bubbles to appear in the finished surface. To avoid this difficulty the linoleum should not be immediately placed in position as soon as the cement is applied. The exact time to be allowed between placing the glue or cement and laying down the linoleum can be determined only by experience.

When linoleum is applied over concrete and there

is dampness present in the concrete, there is considerable likelihood that the backing may separate from the linoleum, causing the linoleum to bubble and eventually break through. This is particularly true where the concrete is deposited directly upon the earth. The solution of the problem is either to waterproof the upper surface of the cement or to have sufficient cinder fill under the concrete, with an applied coat of damp-proofing material on the top so that the moisture may not work its way through and attack the material which holds the burlap to the linoleum composition.

A concrete floor with a linoleum or cork carpeted surface is very satisfactory in that it is almost noiseless; it affords an insulating material between one floor and the floor below, and it is sanitary and can easily be kept clean. The most advanced method of laying linoleum is to cement a lining felt over the entire floor area to which the linoleum is cemented. When the material is applied in this manner to a concrete floor which is sufficiently dry, the most perfect results possible to obtain are assured, providing the concrete is sufficiently level and smooth. This lining felt comes in two widths and is similar to unsized building paper.

When linoleum and cork carpeting were first cemented to concrete floors, it was considered necessary that the entire floor surface should be rolled and heavily weighted with sand bags. This process of laying is not usually adopted today, particularly where the lining material must be brought into intimate contact with the entire surface to which it is applied and all air expelled. If the cement is properly applied and timed correctly there is little chance of the material separating from the floor. The floor covering should always be cut to approximate lengths on the floor and left to "weather" for a certain time before being applied. This will give an opportunity for the material to swell (there is little likelihood of shrinkage), and when laid it will remain inert.

Some architects also specify that all seams should be bradded. Usually linoleum, when laid with butt joints, is weighted down with sand bags along all seams. This is obviously desirable in order to hold in place the edges of the material which otherwise might have a tendency to curl. If the concrete is of the more or less porous quality, and if a quick-setting cement is used, a steel brad may be driven through the linoleum into the concrete with the assurance that the seam will stay in place. The brads best to use are approximately ⅜ inch long and have very small heads which make them practically invisible. If the workman cannot obtain this steel brad at the time needed, a worn phonograph needle can be used with very good results.

It is quite essential that the architect, when specifying such floor coverings, should be able to differentiate between the different kinds of materials. If, however, the material be purchased from a well recognized manufacturer there is little danger of a poor quality being used. It is well to see that the material is properly cured and to have it delivered at the building where it is to be used as soon as conditions warrant, so that it may be carefully examined and placed under observation for a period before being laid.

Some linoleums are made up of all sorts of adulterated materials, such as whiting, wood flour, sawdust and inert pigments. The U. S. Standard Battleship Linoleum is made with good oil, a proportion of pulverized cork, and a small proportion of wood flour, with a binder in which the color may be mixed. This linoleum may be treated with special stains or waterproofing finish in such a way as to make the surface practically impervious to the absorption of any material. For example, both ink and grease can be removed without leaving any stain whatever.

Cork carpet is made entirely of ground cork, oil and pigment, although some instances have been found in which wood flour and sawdust have been used on account of economy in manufacture. However, cork carpet made under these conditions would not be practical as in the presence of moisture the wood particles decompose and the value of such a carpet as a floor covering would be destroyed far too soon.

In recent years the designs which it is possible to obtain in linoleum, both printed and inlaid, cover a range so wide that almost any taste may be suited. Some of the effects that are obtained are of such a character that at a distance one can hardly tell the difference between the linoleum and a good rug. The pattern lines have been softened and producing the appearance of careful weaving has been so well studied that linoleum has established a place for itself never before obtained. Colors can also be had, suitable for any use.

In cork carpeting, designs are not so frequently used. Usually we see floors of this material of a solid tone, frequently, however, with panels or borders of different colors to break up the monotony of a single-color floor. In this material also considerable variety in colors is obtainable.

The widespread use of fabricated floor coverings in business structures and public buildings is in itself an indication of their excellence. These flooring materials are used because they are economical as well as particularly suited to uses of the most widely different kinds.

In addition to cork carpeting and linoleum there are various other composite floorings, which will be discussed in a later issue.

The Direct Sub-Contract Method of Building

EXTENSIVE consideration has been given during the past year, through the editorial pages of THE ARCHITECTURAL FORUM, to the subject of contractual relations between the three interested parties in the average building operation—the owner, the architect and the building contractor. Various forms of building contracts which have been considered include the straight cost, cost-plus, the lump sum, the cost-plus-fixed-fee contract and various possible penalty and bonus clauses. Methods of selecting building contractors under each system have been analyzed, and it has been found possible under the cost-plus-fixed-fee form of contract to select builders on a fair competitive basis. Any consideration of this general subject would be incomplete without discussing the direct sub-contract method of carrying out a building operation, eliminating entirely the services of a general contractor. As most architects know, the findings of The American Institute of Architects include favorable consideration of a method of handling a building operation, in the course of which the architect, having completed his plans, divides the project into a series of sub-contracts. In behalf of the owner he then takes competitive bids on these various portions of the work and places directly contracts covering each part of the operation. The building then proceeds under the direct supervision of the architect, whose business it is to correlate the activities and interests of the different contractors.

In order that there may be no misunderstanding as to the attitude of The American Institute of Architects, which has expended serious study on this question, we quote from the recently published "Handbook on Architectural Practice," an official document of The Institute:

It is obvious that the duties falling on the architect under the separate contract system are much heavier than when the work is let under a single contract. Instead of conducting one bidding, asking and receiving bids from a few competitors, he conducts from 15 to 20 biddings on the separate parts of the work, asking and receiving bids from say 100 contractors; instead of guiding and supervising the work of one contractor, whose duty it is to bring the sub-contractors into co-operation, the architect must guide the work of the contractors for all the trades, harmonize their operations, be vigilant that they and their materials are ready when needed, see that they employ as large a force as can properly work, and settle differences between them. The architect must also keep more records of transactions and suitable books of account, and he must carry on a much heavier correspondence than under the other methods. He must himself be at the building more frequently than is ordinarily the case.

While this procedure saves the owner the profit on the entire work, to which the general contractor is entitled, on the other hand, since many of the contractor's duties devolve upon the architect, he must be paid for them. The Institute's "Schedule of Charges" (Appendix D) and the "Form of Agreement between Owner and Architect" (Appendix E) therefore provide for an additional remuneration to the architect when the separate contract system is employed.

It must not be supposed that when the architect directs the work of many contractors instead of a few his professional status is lost, or that he becomes in any sense a contractor. The owner signs the many contracts, just as he would the few, and the relation of the architect to the owner and to each contractor remains without change.

Those experienced in the separate contract system thus sum up its advantages:

(*a*) Exact knowledge, before any contract is let, not merely of the total cost of the work but of the cost of each of its important divisions. If the cost is to be cut, it can therefore be cut intelligently, the details being in hand and direct access to all who figure on the work being possible.

(*b*) Lower bids, because each contractor, as he deals directly with the author of the plans, may know exactly what is expected of him and may make contracts directly with the source of payment. This enables him to estimate more intelligently, with greater confidence, and consequently more closely, than in cases where he is obliged to submit his estimate to a number of persons whose financial responsibility he may doubt and who can offer no assurances that they will ever be in a position to let the work.

(*c*) Direct control of the selection of contractors for each branch of the work and direct distribution of payments to those who would otherwise be sub-contractors.

(*d*) The architect's more intimate relation with the construction of the work.

Under the separate contract system, the number and complexity of the architect's duties are such that a word of warning is necessary to architects who may think that they would like to work under that system. No architect, unless he be a capable administrator and have his office well organized for such work, should attempt it, nor should he imagine that the additional percentage will be a source of large profit. He will find that expenses of all kinds will be greatly increased and that his own burdens, and especially his responsibility, will be much greater than he would suppose.

In fine and in brief, if the separate contract system be well administered, it is admirable; if badly administered, it will result only in loss and annoyance.

The Growth of an Idea

It must not be thought that this method of handling a building operation directly through the architect's office is a new idea. It has been done for many years—in fact ever since the inception of architecture as a profession. It is the method through which buildings were constructed centuries ago, before the general contractor came into existence and at a time when the architect was the "master builder," in fact as well as in name. It is true, however, that general interest on the part of architects in this method of handling a building operation has developed in an almost unbelievable degree during and since the war period.

We find upon analysis that not only in the case of smaller housing projects, but even in the development of large building enterprises this method is being more extensively employed than ever before. Certain architects have in fact specialized in, and developed their organizations to render, this service to the client. In a measure the development of such an activity on the part of the architect has assumed the form of a defensive reaction, influenced by two causes:

1st: The fact that many contracting and engineering firms have established architectural departments in order that they may render complete service to the owner, a fact which has given the architect serious concern.

2nd: This method, with its resulting economy for the owner, has made possible the carrying out of many building projects which would otherwise have been delayed or abandoned.

The architect has discovered this activity as a means of increasing his revenue and maintaining his organization during otherwise dull periods. This has been particularly true in the Middle West, and the practice is gaining steadily in favor.

Naturally, the general contractor must look with disfavor upon this development and it is true that it opens up many possibilities which may act as a boomerang to those of the profession who may adopt this method of handling building operations. In discussing this matter with several architects who have been successful under such a plan, we uncovered an expression of opinion which is based on fact. There are two kinds of general contractors in the building business. One type includes large and small organizations which have developed efficient personnels to carry out building contracts, subletting only a small proportion, as in the form of sub-contracts. Such organizations are skilled in the buying of materials and the hiring of labor. Consequently the contractor's profit represents the fee which the owner pays to have his building constructed efficiently and under economical conditions. On the other hand there are many general contractors who are in effect brokers, taking a contract with the idea of re-letting most of the work in the form of sub-contracts, on top of which will be a profit for themselves.

In studying the development of interest on the part of architects in this subject, we find also that it increases proportionately as the size of the building project decreases. In other words, where the project is the construction of a moderate cost residence or several such buildings, the architect knows that this job can be divided into approximately six or seven sub-contracts, and that it is a comparatively simple matter to get estimates and bids on each of these divisions of the work, which in total will represent practically a guaranteed cost to the owner. Here there exist none of the usual complications, which grow in volume in size with the building project. It is found also, in these smaller operations, that the average contract is let to a carpenter or a mason, who in turn sub-lets four or five divisions of the work. We find, therefore, a condition in which the personal element plays a very important part. The size of a job, which may be carried out by the architect through the medium of letting a number of contracts on different portions of the work, depends entirely upon the capacity of the architect and his organization to control his work in an efficient manner.

The method of handling the operation naturally must rest with the owner, and the architect who wishes to handle the project directly is in a sense assuming the position of general contractor. He is not doing it in a manner which is unethical in any way. He becomes merely the broker acting in the interest of the owner, and there is much to be said in favor of this condition and the possibilities it offers in cutting down the cost of building by eliminating what might be called the "wholesaler's profit"—if we may use this commercial term. Owing to the fact that the element of personal ability and experience enters so extensively into this consideration, it is difficult for the architect to take any stand for or against the direct method of carrying out a building project under a series of contracts. If the architect can do this efficiently he will certainly save some money for the owner. On the other hand, if he cannot see his way clear to maintaining the proper relations between various sub-contractors and supervising efficiently the operation as it proceeds, it is better for him to recommend the general contractor method.

Allocating the Contracts

It has been found, in offices where the system is employed, that the size of the organization required naturally depends upon the size of the work to be carried out. We know of one architect who at this time is carrying out five individual dwellings, averaging $30,000 in cost. He has not only developed complete designs, working drawings and specifications, but has purchased practically all required materials and has let contracts covering the different branches of the work. In this case his fee for the work is 12% on the cost of labor and materials, and all the buildings are progressing to the satisfaction of the respective owners.

Each building project naturally divides into a series of logical contracts. It is the practice of the average architect who enters into an undertaking of this nature to draw up in connection with his specifications a careful outline of his sub-divisions of the work. For instance, in the case of one recent project involving the construction of six small houses, separate bids were received covering these different divisions:

1. Excavating, foundations, all masonry and rough plaster.
2. Carpentry work throughout.
3. Plumbing and heating.
4. Electrical installation.
5. Painting, papering and plaster finishing.

6. Grading, planting and other work on grounds.

It is necessary in this manner to allocate carefully the various sections of the work in order that bids may be taken. This should be done in such a manner that there can be no misunderstanding on the part of the bidder as to the portion of the work included under his part of the contract. Naturally, consideration must be given to the requirements of the various trades so that there will be no complications later. The question of purchase of materials also enters into consideration and, as far as the architect is concerned, this must depend largely upon the possibilities of obtaining bids on labor contracts only. Usually, and particularly in smaller operations, the individual bidder wishes to figure on both labor and material, as this introduces an additional element of profit to make the contract worth while for him. In any event, whether through direct purchase or under specifications, the quantity and quality of material must be controlled by the architect. In some instances it has been found advisable to work out a quantity survey under each contract division.

Arriving at a Guaranteed Cost

It is evident that if the preliminary work on building operations designed to be carried out by such a method is carefully done, so that the various contracts are properly allocated to cover the entire work, it is possible to develop a cost figure which represents practically a guaranteed price from the owner's viewpoint. The only element of uncertainty involved is that one or another of the sub-contractors may fail to carry out his agreement. If the selection of the contractor on each portion of the work is based on a logical cost figure, and on worthy past performances, this danger is comparatively negligible as we have now reached a stage of building conditions where it is quite possible for a sub-contractor to figure with a fair degree of exactness, both on material and on labor. Outside of the large cities building labor has been fairly well stabilized, in spite of all newspaper reports to the contrary. The American workman has to a great extent cast off the influence of the hectic conditions of the post-war period and is giving a good measure of production for each day's pay. In the average locality and in the average building trade there are more men than there are jobs. The law of supply and demand is functioning again and with it there has been developed among employers generally a degree of fair play and sound, businesslike consideration of the rights and interests of the workmen. Good employers in the building field are as a rule not finding any difficulty in obtaining good employes, and the sub-contractor on the average work now enters upon his duties with a fair degree of certainty that he can carry out the terms of his bid and receive a fair profit in so doing. Inquiry among sub-contractors brings out this interesting but natural condition: They are always glad to work for a general contractor, because they realize that the average general contractor understands their problems and will discuss such problems with them on their own level and in understandable terms. Their attitude toward working directly for architects involves again the personal element to a great degree. Some say that they do not like to work for architects because they have sometimes been placed in positions where architects have insisted on *talking down* to them without a proper understanding of the field problems involved in construction work. The architect may well give thought to this phase of the matter if he is to carry out successfully building projects in which he deals directly with the sub-contractors.

Controlling the Work

In a building operation carried out through direct contact of the architect with various contractors it may be seen plainly that the work must be controlled through efficient field superintendence, careful supervision of the contractor's work, and complete co-operation on the part of the office with the field. This involves, primarily, the selection of a capable and experienced field superintendent. This man acts directly as a representative of the architect, functioning, as far as the work is concerned, in the same manner as he would if he were employed by a general contractor. His experience should include past employment by general contractors and it is necessary that he be of a diplomatic nature in order that he may maintain proper relations on the work between the various sub-contractors. Usually he has one assistant, whose duty it is to keep the field accounts and progress charts, to expedite material deliveries and to act as *liaison* representative between the office and the work on all of the less important details. The architect, or a representative delegated from the designing department, usually carries out supervision of the work in the same manner as if it were under the direction of a general contractor. Evidently, it is of primary importance to allocate responsibilities in a common sense way and in accordance with the experience of the various individuals who may be employed in connection with the work.

After consultation with the various contractors, a complete estimating progress chart should be made out indicating the time at which various sub-contractors will begin their work and showing the approximate amount of time which should elapse until the work is completed. After these base lines have been developed on the chart, copies should be kept in the field office and in the architect's office. In this manner progress can be recorded in the field and reported for further recording in the architect's office. Special pressure can then be brought to bear at any point where the work seems to be lagging, thus eliminating the waste of delay which has been fatal to the successful carrying out of many building projects. The system of checking an account should be simplified as far as possible and the duplication of records should be avoided. The details of ac-

counting should be carried out in the office rather than in the field, and it is particularly feasible to do this under a series of sub-contracts, such accounting being based on progress and delivery reports received from the field office.

Fees and Overhead Costs

Inquiries made in a number of offices where work has been carried out in this way indicate that the usual method of charging for the architect's time covers the entire project, including full architectural services, obtaining bids and letting contracts, purchasing materials wherever necessary, and general supervision of the work, including all necessary accounting. The charge for this complete service is made either in the form of a percentage on the total cost of the work, when it seems to vary from 8 to 15 per cent, depending on the nature of the work, or by agreement as to a lump sum for the complete service as described, this sum being payable about one-half during the preparation of working drawings and specifications, and the balance in approximately equally monthly divisions during the carrying out of the work. The amount agreed upon usually compensates the architect for all service rendered with the exception of traveling expenses for himself and his force, and the salaries of the field superintendent and his assistant, which are usually charged directly to the owner as part of the cost of the work.

In many instances it is found that owners are willing to consider this method of carrying out the operation, provided the total cost estimated on sub-contractors' bids is not beyond what they are willing to pay for the building. Accordingly, arrangements are usually made which define the amount of payment to be received by the architect for full architectural services up to the point of obtaining definite bids, and chargeable in case the owner does not elect to proceed with the job. The amount which the architect will charge for the work up to this point is debatable and depends entirely on conditions in his office and his personal willingness to gamble in the development of work. In a number of offices it is found that agreements are being made with owners to carry out the work up to the point of obtaining final bids from sub-contractors, on a basis which will cover the cost to the architect, but gives him very little profit unless the job proceeds.

Much depends, naturally, on the nature of the building operation. If it is a purely residential project, it is usually found that estimates can be made from sketch plans which will determine the owner's willingness to proceed and that it is unnecessary to carry out further details of the work except on the usual arrangement. On the other hand, if the project is of an investment or commercial nature and if the architect's office is not particularly busy, it is sound business to proceed with the necessary preliminary and detail work up to the point of obtaining final contract figures where the architect is reimbursed for the cost of such work, and gambles only on prospective profits. This serves a double purpose of maintaining an income to meet overhead expenditures, to support the organization, and establishing close relations with a work which may logically be expected to proceed, either immediately or at a time when refiguring will show a total within the owner's limit of investment.

It may be clearly seen that this method of handling business operations through an architect's office is but a natural outgrowth of the present unsettled conditions in the building field. From the owner's viewpoint it offers an opportunity for detailed study of his building project. Where lump sum contract figures are obtained, the owner's answer to such bids must be predicated upon the total amount submitted. If any of the bids are low enough to meet a favorable response the owner knows to a certain extent it is a gamble for the contractor of the building to carry out his agreements. Where sub-contract figures are obtained, however, it is possible to dig much deeper into the cost situation and where figures seem high it may be possible to bring about reduction through co-operation between the architect's office and the bidder. Certainly when an owner proceeds under several contracts for various parts of the work, the total of which figures makes up the entire cost of the job, he is reducing the element of chance as to the contractors' ability to carry out the work. This is true primarily because the amount of money involved in each individual contract is smaller and because each bidder is estimating in a field with which he is thoroughly familiar.

In a sense, this method of building may be considered as being in an experimental stage and its operation may tend favorably to eliminate the class of contractors who, after all, are principally brokers, dealing between the architect as representative of the owner and the sub-contractors who actually do the work. In line with many other interesting experiments which have developed under the rapidly shifting conditions of the construction industry, its outcome is to be watched with considerable interest. In bringing the architect into closer contact with actual field experience it must have a beneficial effect on the profession generally—an effect which, in working back through the sources of design, will tend to encourage standardization and economy.

It may be noted here also that never before has it been so important for architects to give careful study to price trends and conditions in the building material and labor fields. This study should extend also to a careful consideration of new uses of materials which may offer themselves as usable substitutes at lower costs. This same thought may also be extended to include closer contact with the real estate and mortgage fields. A definite knowledge of rental values and sources of mortgage money serves the architect well in times such as these.

The Restoration of the Fine Arts Building

OF THE WORLD'S COLUMBIAN EXPOSITION, CHICAGO

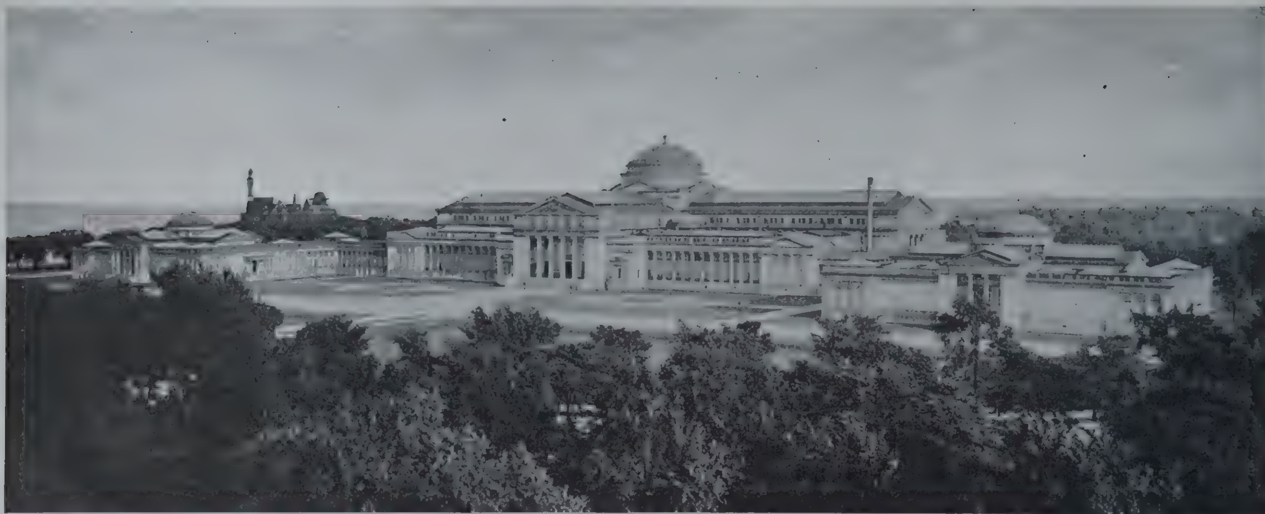
By GEORGE W. MAHER

Chairman, Municipal Art and Town Planning Comm., Illinois Chapter, A. I. A.

TO many who knew the World's Columbian Exposition, in 1893, the most notable of the structures was the Fine Arts Building. Extended at the edge of a broad lagoon it presented an appearance of antique magnificence, which was heightened at night when the low dome and the shallow loggias were bathed in soft amber light from concealed sources. It is of a pure type of classic architecture (Greek in spirit) and has been pronounced by eminent authorities one of the most noteworthy buildings of its kind in the world. It possesses generous proportions, wide extent of facade and beauty of central dome effect which, combined with the refinement of architectural detail and sculpture, make it a most stately architectural conception and worthy of preservation for all time. It was designed by Charles B. Atwood, architect, who was associated with Daniel H. Burnham, the directing architect of the World's Columbian Exposition. The central motif was suggested by Benard's "Grand Prix de Rome" drawing, but Mr. Atwood refined and changed the detail to pure Greek. He designed the balance of the structure in accord with the central motif, and produced a result unequaled since the days of Pericles.

It has been suggested in a general way that the building should be wrecked, since the Field Museum of Natural History, which has been housed in this structure since the close of the World's Fair, has been removed to its new home in Grant Park. The general impression has gained credence that the building is in a state of disintegration, due to the exterior appearance of the plaster work and ornament which, owing to its original temporary nature, is in a bad state of preservation. The facts, however, are that the building proper was not constructed as a temporary structure; the main walls are of solid brick and perfectly sound, and the foundations of brick and concrete and the entire structural features are in good condition.

Detail of the Fine Arts Building from the Lagoon, as It Appeared in 1893



General View of the Fine Arts Building, Showing Lake Michigan Beyond

The Illinois Chapter, A. I. A., through its Municipal Art and Town Planning Committee, and also in conjunction with the Illinois Society of Architects, has undertaken the responsibility of saving and perpetuating the building. They have submitted an expert report to the South Park Commissioners, covering in detail the cost of rehabilitating it and have also set forth the many purposes for which it may be used, among which might be mentioned a great community recreational and art center for social and educational purposes; a branch museum for the Chicago Art Institute, which needs additional space, and an appropriate museum for large architectural and sculptural casts and models that otherwise might be destroyed for lack of space and accommodations. In fact it might well become a great center for the Liberal Arts, and be a stimulus for creative and American art in all of its various branches, inclusive of music and the drama. The many art uses that this building could be advantageously employed to serve would materially assist in making Chicago the art center of America.

The report recommends that the entire exterior, including the statuary, be of waterproof Portland cement plaster, and that when restored the structure appear architecturally exactly the same as during the World's Fair period. The expert estimate for performing this work, inclusive of installing a heating plant, plumbing fixtures and new glass in the roof skylights, amounts to $1,640,000. The building as it stands today in Jackson Park occupies an approximate area of 4¾ acres. It has a probable value of at least $3,000,000. It is estimated that it would cost considerably more than this amount to erect the structure today, but that on the other hand, if wrecked, there would be no salvage and an additional expense for adjusting and leveling the park grounds would have to be met. The architects' committee is, therefore, assured that $1,640,000 for rehabilitating the structure is not extravagant, since the building could not be properly erected today for less than $10,000,000.

The Illinois Chapter, A. I. A., is much encouraged by the interest that has been awakened in its efforts to save the building. The leading newspapers in press reports and editorials, and also the city's leading clubs and civic and social organizations have endorsed the proposed project of restoration. There seems to be a universal desire on the part of the public to save this noble building from destruction. Around it cluster, and are interwoven, sentiments and memories that affect thousands of people and whose inarticulate opinion the architects are glad to voice in the hope of preserving this historic structure.

An interesting letter from Lorado Taft, dated November 25, 1920, explains the positive need of a museum in Chicago for the housing and perpetuating of great works of art and models that at certain times are easily obtainable if a place can be provided for their installation. At the present time there are no facilities or storage spaces for such works of art in Chicago, and as a result the art heritage of the city is hampered;—pathetically so, since the important work referred to cannot be accommodated and much is necessarily destroyed. The opportunity to supply this need is within Chicago's grasp; the old Fine Arts Building when restored will adequately meet the demands and requirements, since it possesses great size, height, skylight facilities and a satisfactory arrangement of plan. The building is located in an unequaled situation, for it occupies a commanding position in one of Chicago's most beautiful parks, in close proximity to Lake Michigan. When the proposed Lake Front improvement and great boulevard links are completed this noble edifice, one of the most beautiful classical architectural structures in the world, will become a necessary unit in this gigantic municipal improvement.

The Fine Arts Building is perhaps the best known structure in Chicago. It is loved and revered by tens of thousands of people in America and abroad. It possesses historic significance and sentiment that appeal to all and it is a cultural asset that any city should be proud to possess.

SOUTH FRONT OF BUILDING AS IT APPEARS TODAY

PRESENT VIEW OF NORTH PORTICO

FINE ARTS BUILDING OF THE WORLD'S COLUMBIAN EXPOSITION, CHICAGO

CHARLES B. ATWOOD, ARCHITECT; DANIEL H. BURNHAM, DIRECTING ARCHITECT

EDITORIAL COMMENT

PRIDE IN WORK WELL DONE

IN the consideration of works of architecture it is perhaps a natural tendency for those trained in the art to look not much further than the design for the reasons for a successful piece of work. The design, of course, is paramount; it is the visual record of the artist's conception of the building. The design, however beautiful it may be, is after all but a drawing; it may have excellence in line, proportion and pattern, but it remains draftsmanship; it must be executed to become architecture.

In the process of execution conditions arise that have power to affect the ultimate work for good or evil. The architect has exercised his talents in research, study and invention in producing the design, but duties fully as important rest upon him in controlling and directing the execution. We frequently hear dissatisfaction expressed with the methods of building today, but sometimes evidence appears to indicate that the finest results are obtained under these very same methods, and they lead us to ask if the full merits of present means have been discovered by those who criticize.

An example of this is seen in the Cunard Building. This structure, we feel, is generally accorded a worthy place in architectural achievement. Behind this, there is a story of the building which for interest and a record of modern achievement compares favorably with the romance and legends of cathedral building. It is a vindication of modern methods and points a lesson to architects that the success of their work will be more certainly assured if they recognize the necessity of means that have been developed as our attempts at building have grown larger, and govern their function of general directors to accord.

The Cunard Building was planned and constructed during the most trying times just following the war, when the labor and material markets were at the point highest in the world's history. In spite of the unfavorable circumstances, the complete designing and erection of the building was accomplished in less than two years. It was completed on schedule time, finer and larger than contracted for and within three per cent of the original cost estimate. The various mechanical and engineering features of the building were designed for the utmost efficiency in operation, and the successful co-ordination of these intricate details is indication enough of the co-operation that existed among those whose group effort produced the structure.

In writing of the building Mr. Morris has said: "Co-operation, courage, forethought, loyalty and persistence appear to me to have been the qualities conspicuously shown by the makers of the building, without which the whole performance would have been a very different thing. The example was given by the owning corporation and has been followed down the line to the humblest laborer, almost without exception. I feel safe, and take pride in the assertion of my belief, that in no other country, and in no other city, could this building have been built as and when it was built. The animating forces just mentioned seemed to produce a pervading sense of joy and satisfaction among us all. Hours of work by union labor were limited, of course, by the strictest regulation, but certainly in 'the field,' that is, on the job, I never saw any evidence of restricted output. It is commonly accepted among employers, if they are willing to admit it, that the amount of wages paid is, within reasonable limits, negligible in final cost, if the return given by labor is active, intelligent industry during the time paid for."

The work of directing an enterprise of this magnitude is comparable with the functions of a general in the army. Hundreds of firms and individuals are required to complete it, and the utmost precision must be observed in arranging details and instructions from the architect's office to be available in sequence with the work of the various trades. Then there is the contact of the office with the job. The architect is, of course, the final director but the detail work and the actual supervision are carried out by his representative — the superintendent. This man must have many of the qualities of the successful architect. He must be able to check plans and specifications to determine their completeness; he must know materials and workmanship, and above all things he must have the ability of handling men, whether they be clients, designers, contractors or workmen, for upon this qualification depends the speed or delay, the satisfactory or disappointing quality of the finished building.

It is through the generalship of the architect, carried out in co-operation with the various specialists, his own office, the field workers and the builders, that his personality reaches the workmen and the enthusiasm is created that makes a work of architecture in which all participating may take common pride. Thus is architecture made a living force and the profession lifted out of the cloister and into the light of day.

NOTE

We are pleased to announce that the strike of pressmen, which has interfered with the publication of The Forum since April 1, is now adjusted and that we will be able to regain our publishing date with the next issue.

Sturtevant

REG. U.S. PAT. OFF.

PUTS AIR TO WORK

THE CUNARD BUILDING is a product of quality throughout. It ranks foremost among important buildings of the country in architecture, construction, decoration and mechanical equipment.

Architectural and engineering skill have co-operated to make a lasting monument to a great business enterprise. The searching analysis of products leading to the specification of Sturtevant apparatus is a vindication of the quality and service claimed for

Sturtevant Ventilating Equipment

Benjamin Wistar Morris, *Architect;* Carrere & Hastings, *Consulting Architects*
Meyer, Strong & Jones, Inc., *Mechanical Engineers*

The same service and assurance of quality are available to architects throughout the country. We maintain twenty-four branch offices as listed below where you will find qualified engineers ready to serve you. Special research problems are gladly undertaken at our Hyde Park headquarters.

The following brief facts indicate the size and importance of the Sturtevant ventilating installation in the Cunard Building. There are eight separate systems, divided as follows: 1. Mechanical plant in sub-basement. 2. Cunard quarters in basement and first floor. 3. Cunard quarters on second and third floors. 4. Mechanics and Metals National Bank in basement, second and third floors. 5. Vaults in basement and sub-basement, and three systems to ventilate all toilet and locker rooms throughout the building.

B. F. STURTEVANT COMPANY

HYDE PARK, BOSTON, MASS.

STURTEVANT BRANCH OFFICES

ATLANTA, GA. 306 Walton Bldg.
BOSTON, MASS. 555 Mass. Trust Bldg.
BUFFALO, N. Y. 100 Bedford Ave.
CHICAGO, ILL. 530 So. Clinton St.
CINCINNATI, OHIO 604 Provident Bank Bldg.
CLEVELAND, OHIO 330 Guardian Bldg.
DALLAS, TEXAS 3411 Knight St.
DETROIT, MICH. 406 Marquette Bldg.
HARTFORD, CONN. 36 Pearl Street
KANSAS CITY, MO. 3830 Park Ave.
LOS ANGELES, CALIF. 411 Hollingsworth Bldg.
MINNEAPOLIS, MINN. 804 Met. Life Bldg.
NEW YORK, N. Y. 52 Vanderbilt Ave.
PHILADELPHIA, PA. 135 No. Third St.
PITTSBURGH, PA. 711 Park Bldg.
ROCHESTER, N. Y. 1024 Granite Bldg.
ST. LOUIS, MO. 2086 Railway Exchange Bldg.
SALT LAKE CITY, UTAH 818 McIntyre Bldg.
SAN FRANCISCO, CALIF. 759 Monadnock Bldg.
SEATTLE, WASH. 1105-1106 White Bldg.
WASHINGTON, D. C. 1006 Loan & Trust Bldg.
B. F. STURTEVANT CO. OF CANADA, LTD. GALT, ONT.
MONTREAL 404 New Birks Bldg.
TORONTO 210 Lumsden Bldg.

Manufacturers' Catalogs and Business Announcements

ARMSTRONG CORK COMPANY, LINOLEUM DEPT., Lancaster, Pa., "Business Floors of Armstrong's Linoleum" (6¼ x 9¼ ins.). 40 pp.

This is an attractive handbook intended to show the suitability of Armstrong's Linoleum for floors in public and business buildings. The advantages of this material for the purpose are described in detail, with illustrations showing where it is actually in use. Color plates of a number of patterns that are particularly appropriate add interest to the book, and give some idea of the complete line. The results of the rigid U. S. Government tests as applied to this brand offer an interesting basis for comparison with others, and specifications and directions for laying make the book valuable for reference by architects and builders. Sent on request, with samples and other literature.

THE ASSOCIATED TILE MANUFACTURERS, Beaver Falls, Pa., "Basic Information on Tiles," Publication No. K-200 (7½ x 10½ ins.). 24 pp.

An interesting treatise on tiles, issued for the use of architects, engineers and educators, in order to promote a more thorough understanding of this product and its uses. It is fully illustrated with drawings which supplement the clear and simple language of the text. The basis upon which are determined the regular sizes of tiles is described. Then follows an explanation of the process of manufacture, a schedule of the various kinds and colors of tiles, and more drawings, showing graphically and to scale, the shapes and relative proportions of tiles, classified according to kind. The diagrams indicating possibilities in square formations will be found invaluable to the designer seeking the most economical disposition of his material.

ANNOUNCEMENTS

Mr. Sidney H. Minchin, formerly of the Marquette Bldg., and Mr. Alexander H. Spitz, of the Standard Trust Bldg., have gone into partnership as Minchin Spitz & Co., and will hereafter be located at 19 West Jackson blvd., Chicago. Samples and catalogs requested.

S. Wesley Haynes and Harold E. Mason have opened an office for the practice of architecture at 28-29 Park Bldg., Fitchburg, Mass., under the name of Haynes & Mason. Manufacturers' catalogs and samples requested.

The firm of Foote, Headley & Carpenter, architects, of Rochester, N. Y., has been dissolved, and the business will be continued by the new firm, Foote & Carpenter, at 154 East avenue.

The Board of Education of Columbus, Ohio, has opened new offices at 50 East Town street. These offices will be under the supervision of Howard Dwight Smith.

William Albert Swasey announces the removal of his offices to the Gotham Bank Bldg., Columbus Circle, New York.

Mr. Edward J. Schulte, formerly vice-president of the architectural firm of Simons Brittain & English, Inc., of Pittsburgh, Pa., is now associated with Mr. Robert E. Crowe, a well known Cincinnati architect, under the name of Crowe & Schulte, with offices in the Second National Bank Bldg., Cincinnati.

John Barnard, architect, announces the removal of his office to 171 Newbury street, Boston.

A course in City Planning and Civic Art will be given at Columbia University beginning October 5, 1921 in the Winter Session, and February 8, 1922 in the Spring Session. The subject will be presented through

A. Lectures
B. Field work
C. Drafting-room work

Lecture, 5.10-6 P.M.; Criticism, 8 P.M., Wednesday.
Field work, week ends. This course is included in the University Extension work.
For further information address The Secretary, Columbia University, New York.

The Indiana Limestone Quarrymen's Association, Bedford, Ind., announces the reorganization of its executive personnel for the better handling of Architects' Service Work and other activities.

Mr. H. S. Brightly, the present Secretary of the Association, will become Service Engineer, having charge of the Architects' Service Bureau and the publication of a very comprehensive series of service literature. Mr. R. M. Richter, a former Secretary of the Association, returns as Secretary and Executive Head of the organization.

Cunard Building, New York City *Architects: Benjamin W. Morris and Carrere & Hastings*

SERVICE SECTION
of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

Should Industries Build Now?

AN EXPRESSION BY MORE THAN 200 ARCHITECTS, ENGINEERS AND CONTRACTORS

THE United States, as a whole, is not overbuilt.

Those whose business warrants expansion will make no mistake in building at once, for labor is plentiful and its efficiency is increasing, while material prices have already dropped considerably.

Lower labor costs and possibly a slight further drop in material prices are expected by the building public, and until some such movement is sighted, the present buyers' strike is very apt to continue.

Prices on building materials will probably become stable at around 50% increase over 1913 prices, but complete stabilizing of the market is not apt to occur before late fall or early in 1922.

These are the general conclusions to be drawn from replies just received from over 200 nationally known architects, engineers and contractors in response to a questionnaire sent out by the Detroit Steel Products Company.

Needless to say, opinions vary. While no section of the country appears to be overbuilt, there is a wide divergence of ideas as to what the conscientious builder should recommend. Many in Wisconsin, Michigan, Illinois, Indiana and Ohio say they cannot advise their clients to build now. The New England and middle Atlantic states, however, are more optimistic, while the Pacific coast believes that little is to be gained by waiting. Present tendencies in building seem not materially changed as compared to the first quarter of 1921. In fact, most builders reply, somewhat grimly, that there was practically no building during the first quarter and that the present tendency is "the same." The Southern states seem slightly more optimistic however, replies indicating that there is a slight upward tendency.

Among the items that are holding up building activity at present, and listed in the order of their importance in the replies, are:

Material prices	Labor disputes
Labor costs	Lack of confidence
Unstable conditions	Freight rates
Credits	General business conditions

As to how far the price pendulum will swing and at what point it will become stationary, opinions range up and down the entire scale. Some believe the lowest prices that may be expected will be 100% above 1913, from which point the guesses range downward to 75, 50, 40 and 30% above 1913. No one is so optimistic as to believe that material will make an absolute return to pre-war levels. Some express the answer in ratio to present prices, predicting that the point of stability will be anywhere from 20 to 50% below present figures.

EXTRACTS FROM OPINION OF 200 ARCHITECTS, CONTRACTORS AND ENGINEERS

	New England States	Middle Atlantic	East North Cent.	West North Cent.	South Atlantic	East South Cent.	West South Cent.	Mountain	Pacific States	Total
Should Industries Build Now?										
Should not build	4	8	9	3	2	..	..	4	7	37
Should build	19	18	28	10	11	3	4	6	18	117
Is Your Section Overbuilt in Industrial Buildings?										
Yes	7	11	20	2	1	..	..	..	..	41
No	24	17	29	22	13	5	3	7	16	136
About normal	4	1	4	1	1	..	..	1	..	12
Is the Volume of Industrial Contracts being let right now Greater or Less than it was at a given time during the past Three Months?										
Greater	7	7	3	4	4	2	1	1	6	35
Less	14	17	21	9	3	1	..	4	7	75
Same	12	9	28	12	7	1	2	6	6	83
Do Builders feel that there will be Further Reductions in Material and Labor Prices?										
On Material—										
Yes	25	21	49	16	10	5	2	13	14	155
No	11	10	5	8	5	1	1	..	4	45
On Labor—										
Yes	24	27	43	19	9	6	2	7	17	154
No	11	5	11	6	4	..	1	4	3	45
Do you expect an Increase in Factories and Industrial Building Activity this Year? If so, will it be Sudden or Gradual? When do You think it will Begin?										
Yes	14	15	15	12	7	3	2	3	9	80
No	18	10	38	13	4	2	1	8	9	103
Gradual	16	12	23	9	9	3	1	5	5	73
Sudden	..	..	1	..	1	1	..	..	..	3
Slight	3	4	7	..	..	..	..	1	1	16
Summer	4	2	6	1	2	1	..	..	2	18
Fall	6	5	4	4	1	1	..	1	3	25
1922	3	4	11	2	..	..	..	3	3	26

Financial Statements of Co-operative Apartment Buildings

IN recent issues of THE ARCHITECTURAL FORUM we have described in detail the operation of The Queensboro Corporation which has successfully developed a number of co-operative apartment buildings in New York, and included here are the actual income and expense figures on two of these buildings.

The first building occupies a frontage of 107 feet and contains eight four-room apartments and eight five-room apartments. The gross rent received upon this building during the past year is $14,160, and is thus accounted for:

Heat, repairs and insurance	$1,756.72
Interest on mortgage of $57,500 at 6%	3,450.00
Janitor service and misc. expenses	901.29
Land tax	250.80
Management, 5% of rents collected	708.00
Building tax, year 1921 only	2,086.20
Amortization payment on mortgage at 2%	1,150.00
Total	$10,303.01
Return on investment, or 8½% net	3,856.99

The second building has a frontage of 83 feet and contains four four-room apartments and eight five-room apartments. The gross rent collected on this building during the past year is $11,040, and disbursements are:

Interest on mortgage of $45,000	$2,700.00
Heat, repairs and insurance at 6%	1,604.41
Janitor service and misc. expenses	839.13
Land tax	193.80
Tax on building, for 1921 only	1,687.20
Management, 5% of rents collected	552.00
Amortization payment on mortgage at 2%	900.00
Total	$8,476.54
Return on investment, or 7⅓% net	2,563.46

It is interesting to note that these buildings fall within the sphere of action of the recent New York Tax-Exemption Ordinance. The figures given include the payment of tax. The saving on account of the tax-exemption is figured at $4,000 for a four-room apartment at the tax rate of three cents, which would show a saving of $120 a year on this apartment. In ten years, which is the life of the Tax-Exemption Ordinance, this gives approximately $1,200 saved by those who purchase four-room apartments of this type. In the case of five and six-room apartments the exemption is $5,000, which represents an annual saving of $150, or $1,500 during the period of life of the Tax-Exemption Ordinance.

The figures already given show on the first building 8½% net on the investments of those who are occupying apartments. It shows also 7⅓% on the second building. With the operation of the Tax-Exemption Ordinance these net returns are increased to 13 and 12% respectively. It is apparent that these figures prove the practicability of the co-operative idea. In these buildings the tenant-owners are paying the exact cost of maintenance of the space which they occupy. Their monthly rental, which is termed an owner's rental, covers their share of maintenance cost, a 2% amortization on the mortgage, and earns in accordance with the figures mentioned here.

The buildings erected by The Queensboro Corporation have already housed over 500 tenant-owners and it is apparent that they are all receiving direct financial benefit.

EXEMPTING NEW DWELLINGS FROM TAXATION

WE have previously given in detail the story of the New York Tax-Exemption Ordinance, which has done much to stimulate building and real estate activity. It is with interest, therefore, that we learn that the Constitutional Convention in Louisiana has voted to exempt from local taxation all new homes constructed within four years in cities of that state having 40,000 inhabitants or over. Under this plan only New Orleans and Shreveport are affected.

We believe that this is but another of many tax-exemption movements affecting new dwellings which will be carried out in the course of the next year in various sections of the country. The most recent figures from New York indicate that tax-exemption has been a real stimulus. Henry Curran, President of the Borough of Manhattan, announced July 17 that home building had passed, in cost, the $100,000,000 mark. Since February 25 plans have been filed and construction begun for dwellings to house 20,897 families as compared with buildings to house 6,604 families and costing $37,143,000 during the same period last year.

THE FORUM CONSULTATION COMMITTEE

THIS month we announce the addition of two men to the personnel of the Consultation Committee who will bring to subscribers of THE FORUM information on subjects that are steadily receiving greater attention. The increasing use of electricity is exerting a wide influence in domestic living as well as in manufacturing, and in the planning of buildings, problems involving the provision for electricity constantly arise. The Society for Electrical Development is organized to provide disinterested service in all branches of the electrical industry and through the committee membership of William L. Goodwin, its managing director, the services of the Society are made available to our subscribers.

Safety engineering is likewise a modern development of special concern to the architect. Into this subject enter the selection of materials, methods of construction and mechanical devices that give greater security to the occupants and users of buildings. The National Safety Council is headquarters for such advice. Its director, S. J. Williams, joins THE FORUM Committee and will gladly consider specific problems of architects.

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

FINANCE

WALTER STABLER

Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER

President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN

President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York.

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

SAFETY ENGINEERING

S. J. WILLIAMS

Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN

Managing Director, Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM and THE BUILDERS' JOURNAL.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise.

AUTOMOTIVE BUILDINGS

HAROLD F. BLANCHARD

For years a specialist in the layout and equipment of buildings of this type. Mr. Blanchard is a mechanical engineer and has practical knowledge of special conditions in many sections of the country through personal investigation.

FIRE PROTECTION ENGINEERING

J. D. HUNTER

Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.

President, The Agricultural Engineering Company, Columbus, Ohio. Professor and Head of Department of Agricultural Engineering, Ohio State University.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

LEGAL QUESTIONS

WILLIAM L. BOWMAN

Attorney, Member of the New York Bar

Specialist in legal matters pertaining to real estate and building contracts.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

		NEW ENGLAND: Portland, Me.§	Boston,★ Mass.	Providence, R. I.	Hartford, Conn.	New Haven	New York City	NEW YORK: Albany, N. Y.†††	Utica††	Syracuse	Oswego	Binghamton
(1) Bulk Lime	per cwt.	....	....	....	....	....	....	....	....	....	$1.25	....
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$3.05	$3.25	$3.25	$4.35	....	....	....	$3.70	$3.10	3.90	$3.35
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	4.50	4.50*	4.35*	$4.50	$4.70*	$5.40*	5.25	4.60	4.75	4.50
(4) Crushed Stone	per ton	....	3.00	....	4.35	....	....	3.00	3.75	2.20	3.20	....
(5) Crushed Stone	per yd.	....	....	3.75	3.50	....	4.00*	....	....	2.64	5.25	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	32.00	20.00	28.00	24.00*	25.00	18.40	24.00	22.00	20.00	30.00	22.00
(7) Corner Bead, galvanized	per ft.	.045	.05	.05	.045	.05	....	.06	.05	.05	.05	.05
(8) Drain Tile, 4 in	per ft.	.12	.153	.16	.08	.10	....	.09	.065	.07	.06	.06
(9) Drain Tile, 6 in	per ft.	....	.199	.30	.14	.15	....	.11	.125	.135	.07	.105
(10) Flue Lining, 8½ in. x 8½ in	per ft.	.30*	35%*	.45	.39	.42	....	32%*	.375	.33	.33	.36
(11) Flue Lining, 8½ in. x 13 in	per ft.	.45*	35%*	.675	58	.63	....	32%*	.575	.495	.50	.54
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	90.00	75.00	90 00	70.00	70.00	75.00	87.50	65.00	73.[illegible]	80.00	75.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	135.00	25.00*	30.00*	25.00	21.43	15.00*	25.00	14.50	18.00	25.00	20.00
(14) Gravel, washed	per yd.	2.00*	2.75*	2.00	2.50*	....	4.25*	2.00	....	....	....	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	*	....	....	300.00	....	252.00	350.00*	275.00	300.00	300.00	300.00
(16) Hollow Building Tile (8x5x12 in.)	per M.	*	68.50	....	....	....	....	200.00	....	135.00	....	....
(17) Hydrated Lime (mason's) in 50 lb. paper bags	per bag	.60	.55	.80	.575	.55	.5125	.625	.569	.60	.65	.65
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	....	.60	.85	.625	.60	.65	.65	.694	.70	.75*	.65
(19) Hair	per bu.	.45	.45	.60	.80*	.60	.675*	.75	....	.50	.75	....
(20) Metal Lath, Exp., Gauge No. 24, weight 3.4 lbs.‡	per yd.	.35	.322	.38	.35	.39	.3115	.48	.36	.36	.45	....
(21) Metal Lath, Expanded, Gauge No. 25, weight 3 lbs	per yd.	.35	.32	.37	.34	.38	.285*	.46	.33	.32	....	....
(22) Mortar Color, red	per lb.	.05	.03	.03	.025	.03	.03	.035	.025	.05	.05	.03
(23) Mortar Color, buff	per lb.	.10	.15	.04	.08	.04	.04	.06	.0325	.05	....	.05
(24) Mortar Color, double strength, black	per lb.	....	.30	.07	.35	.30	....	.06	.0575	.08	.10	.15
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	160.00	200.00	170.00	180.00	136.40*	160.00	....	150.00	180.00	....
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	180.00	220.00	180.00	200.00	153.50*	170.00	155.25	160.00	200.00	160.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	.20	.20	.18	.23	....	.18	....	.18	....	.18
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	.22	.24	.31	.25	....	.20	....	.20	....	.20
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.70	3.50	3.70	3.48*	3.70	2.80*	3.60	3.85	3.50	3.35	3.50
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.075	.08	.075	.25	.10	.075	.075	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	90.00	75.00	....	....	....	....	....	....	65.00	75.00	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	40.00	34.00	40.00	30.00*	37.50	.28*	42.50	41.00	35.00	35.00	40.00
(33) Sand (Building)	per ton	....	3.00	....	....	....	....	....	2.50	....	....	4.00
(34) Sand (Building)	per yd.	....	....	2.00	1.75	....	1.80	2.00	....	....	4.00	....
(35) Sewer Pipe, single strength, off list	per cent.	25%	35%	30%	30%	30%	20%	32%	47%	45%	45%	45%
(36) Wall Coping, 9 in	per ft.	.20	30%*	.32	30%*	.28	.32	32%*	.36	.22	.22	.24
(37) Wall Coping, 13 in	per ft.	.30	30%*	.48	30%*	.42	.48	32%*	.54	.33	.33	.36
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	....	....	25.00	....	....	....	....	18.75	....	20.00
(39) Wall Plaster, neat, in cloth, 100 lb. sks, incl. sks.	per ton	24.00	24.00*	24.00*	24.00*	28.00	23.00*	26.00*	22.00*	20.50*	22.50	22.00*
(40) Wall Plaster, sanded, in cloth, 100 lb., incl. sks.	per ton	....	21.00*	21.00*	20.50*	21.00*	18.00*	20.50*	15.00	14.20*	22.50	20.00
(41) Wall Plaster, wood fibre, in cloth, 100 lb., incl. sks.	per ton	24.00	24.00*	24 00*	24.00*	28.00	26.00*	26.00*	19.00	20.50*	25.00*	22.00
(42) Wall Ties, galvanized	per M.	....	12.60	....	7.50	6.00	5.00	6.00	5.00	5.00	6.00	5.00
(43) Wall Plugs	per M.	....	35.00	35.00	....	30.00	30.00*	30.00	36.00	25.00	28.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	7.75	7.50*	9.50*	7.50*	....	8.50*	....	7.50†	7.00*	8.00*	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	2.10**	3.00*	....	3.50	....	....	4.35†	2.85†	3.00**	3.50†	4.00*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.85§*	2.30§*	3.50§	4.25§*	....	....	2.88§*	2.85§*	....	2.25§	4.25§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	50 00	....	65.00*	....	70.00	....	60.00*	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	65.00	...	70.00*	....	....	....	....	60.00	...	....
LUMBER ITEMS				*				*				
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	....	9.00	9.50	11.00*	9.00	10.50*	11.00	10.00*	....	....	12.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	....	....	....	85.00	....	....	....	48.00	....	41.00	45.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	....	....	....	45 00	45.00*	....	62.00	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	....	....	....	38.00	40.00*	....	41.00	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	....	....	....	....	....	40.00	....	40.00	....
(54) 1x4 "B" Flooring	per M. Board ft.	....	....	....	60.00*	....	....	75.00	85.00*	....	70.00	....
(55) Yellow Pine Clear Finish	per M. Board ft.	....	....	....	90.00	....	....	85 00	90 00	....	90.00	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	65.00*	....	....	68.00	....	....	90.00	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	....	....	....	65.00*	....	60.00	....
(58) Cypress Finish Lumber	per M. Board ft.	....	....	....	125.00	....	....	160.00	160.00	....	160.00	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	....	....	70.00	....	....	75.00	70.00	....	90.00	85.00
(60) ½x4 "B" Ceiling	per M. Board ft.	....	....	....	50.00	....	60.00	60.00	65.00	....	65.00	60.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	....	60.00*	....	75.00	60.00	65.00*	....	65.00	....
(62) Mouldings, Yellow Pine	over list	....	....	..	50%	....	....	....	....	....	.015*	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	....	5.50	6.75	....	6.50	6.75
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	5.50	....	5.75	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	7.00	....	....	....	....	....	7.20	7.75
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	6.25	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow Pine Boards	per M.	....	....	....	38.00*	....	....	45.00	48.00*	....	60.00	63.00*

*(Above Item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

§Portland, consumer prices; contractor quotations on application.

†††Albany allows 10% and 2% off to contractors before 10th of month following delivery.

Lime, Barreled (Item No. 3), 280 lbs.—Providence, Hartford, Albany, common; 300 lb. barrel, New York City; **Hydrated** (Items 17, 18)—New York, in ton lots; Oswego, per bu. of 70 lbs.

Crushed Stone (5)—New York, per 2600 lb. yd.

Common Brick (6)—Hartford, at Brickyard.

Flue Lining (Item 10, 11)—Boston, Albany, off list. Portland, 25%—10% cash.

Fire Clay (Item 13)—New York City, 100 lb. bag rate; no credit for returned cloth sacks, Boston, New York, Providence.

Gravel (14)—New York, 2600 lb. yd. Portland, F. O. B. cars; Bostan, Hartford, per ton.

Hydrated Lime (Items 15-16)—Portland, not stocked in Portland; Albany, heavy, less 10% and 2%.

Hair (19)—New York, per lb.; Hartford, 4 lbs. per bu.

Metal Lath (Item 21)—New York City, Gauge 26.

Par. Tile (25, 26)—New York, less than 2,000 ft.

P. Cement (Item 29)—New York, excluding handling, warehousing and trucking costs; Hartford, less 8c rebate.

Plaster Board (Item 32)—New York City, price for each, size 32x36x⅜ in.; Hartford, 32x36x⅜.

Wall Coping (36, 37)—Hartford, Boston, Albany, per cent. off.

Wall Plaster (38, 39, 40, 41)—Returned bags, Syracuse, Utica, Providence, New Haven, 15c; Albany, Oswego, 10c each; Boston, 12c each; Hartford, 13c rebate for bags; New York City, 25c. Sacks extra, Binghamton.

Wall Plugs (Item 43)—New York, chiefly hardware dealers.

Roofing, Slate Surf. (Item 45)—70 lbs., Syracuse; Portland, 3 ply.

Roofing, Smooth Surf. (Item 46)—55 lbs., Boston, Hartford, Albany; 3 ply, 63 lbs., Utica; Portland, 3 ply.

Stucco Board (Items 47, 48)—Hartford, Utica, creosoted.

(Item 49)—Hartford, Utica, spruce; New York City, Eastern spruce.

(Item 51, 52)—Utica, 1x8 in.; (Item 54)—Hartford, B Flat; Utica, flat grain; (Item 56)—Hartford, fir; (Item 57)—Utica, spruce; (Item 61)—Utica, 6 in.; Hartford, 6 in. Red Cedar; (Item 62)—Oswego, per inch; (Item 67)—Binghamton, Hartford, No. 2 C.; Utica, No. 2 Com.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. NEW YORK, PENNSYLVANIA, NEW JERSEY

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note elow.

A star (★) after city name, denotes no revisions eceived.

Item	Unit	Elmira	Rochester	Buffalo	Jamestown, N. Y.	Allentown, Pa.	Erie	Philadelphia	Reading	Pittsburgh	Scranton	Newark, N. J.	Paterson, N. J. ★
(1) Bulk Lime	per cwt.	....	....	....	....	$0.75	....	$0.64	$0.75*	....	$0.80	....	....
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$3.80	$3.50	$3.25*	....	3.00	$3.40	.75*	....	$2.90	3.00	$3.15*	$ 3.60
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	5.25	4.75	5.00	....	4.00	5.10	....	....	5.25	....	5.70*	5.50
(4) Crushed Stone	per ton	....	2.50	....	....	2.10	2.30	4.50	3.00	7.00*	2.75	3.35	3.15
(5) Crushed Stone	per yd.	2.50	2.00	....	....	....	....	....	....	....	....	4.00	3.65
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	30.00	18.00	25.00*	$35.00	19.50	26.00	20.00*	20.50	20.00	22.00	21.00	20.00
(7) Corner Bead, galvanized	per ft.	.07	.05	.05	....	.06	.04	.04	.05	.06	.06	.05	.09
(8) Drain Tile, 4 in.	per ft.	.09	.06	.055	.085	....	.0525	....	.07	.08	.08	.09	....
(9) Drain Tile, 6 in.	per ft.	....	.11	.12	....	....	.095	....	....	....	.14	.1675	.17
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.50	.30	.30	.42	.36	33*	.36	.36	.33	.38	.39	.42
(11) Flue Lining 8½ in. x 13 in.	per ft.	.65	.45	.45	.63	.54	.50*	.54	.54	.495	.57	.585	.63
(12) Fire Brick, Standard 9-in. No. 1 clay	per M.	80.00	65.00	75.00	75.00	60.00	75.00	75.00	70.00	80.00	70.00	69.00	85.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	20.00*	20.00	18.00*	30.00*	18.00‡	16.00	22.00	22.00	20.00*	20.00*	17.00	35.00
(14) Gravel, washed	per yd.	2.00*	2.50	2.90	....	....	3.50	2.80*	4.00*	2.00*	2.00*	4.20	3.50
(15) Hollow Building Tile (8x12x12 in)	per M.	260.00	275.00*		....	235.80	260.00	....	....	120.00	280.00	285.00	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	....	100.00	118.00	120.00	111.20	100.00	....	....	....	....	120.00	....
(17) Hydrated Lime (masons) in 50-lb. paper bags	per bag	....	.475	.50	.75	.50	.55	.45	.60	.55	.60	.50	.60
(18) Hydrated Lime (finishing) in 50-lb. paper bags	per bag	.75	.50	.525	.75	.66	.575	.6125	.80	.60	.70	.65	.70
(19) Hair	per bu.	.65*	.75*	.48	....	.75*	.15*	.40	.50	.75*	.70*	.70	.50*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.45	.39	.36	.39	....	.40	361	.40	.32	.35	.39	.50
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	....	.37	....	....	....	.36	.3415	....	.32	....	.38	.43
(22) Mortar Color, red	per lb.	.06	.06	.03	.05	.038	.03	.035	.05	.0225	.06	.03	.04
(23) Mortar Color, buff	per lb.	.06	.06	.035	....	.047	.035	.035	.04	.0325	.06	.04	.15
(24) Mortar Color, double strength black	per lb.	.10	.06	.06	.06	....	.06	.10	.10	.05	.08	.07	.15
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	150.00	122.00	....	....	100.00	210.00	....	....	....	145.00	270.00
(26) Partition Tile, Clay (4x12x12 in.)	per M.	150.00	140.00	137.00	....	138.00	115.00	230.00	....	110.00	160.00	160.00	300.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	.0975	.135	.12	.16	....	.16	.18	.15	....	.1525	.20
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	.12	1625	.16	.17	....	.19	.19	.17	....	.195	.21
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	3.40	3.00	3.35	3.30	3.00	3.40	3.30	3.50	3.00	3.40	3.05	4.00
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.25
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	.....	50.00	*	....	75.00	....	....	55.00	45.00	45.00	51.00	55.00
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	37.50	40.00	33.75	37.50	38.00	55.00	40.00	45.00	50.00	42.50	32.50	37.50
(33) Sand (Building)	per ton	....	....	....	....	3.80	3.00	....	4.00	2.00*	3.00	2.15	2.60
(34) Sand (Building)	per yd.	3.50*	2.50	2.90*	....	....	3.00	2.55	....	....	....	2.70	2.75
(35) Sewer Pipe, single strength, off list	per cent.	40%	45%	45%	35%	39%	45%	38%	35%	45%	37%	35%	30%
(36) Wall Coping, 9 in.	per ft.	.25	.22	.22	.28	.24	.22	.248	.30	.22	.26	.26	.28
(37) Wall Coping, 13 in.	per ft.	.36	.33	.33	.42	.36	.33	.372	.45	.33	.38	.39	.42
(38) Wall Plaster, neat, in paper, in 80-lb. bags	per ton	23 00	20.00	21.00	22.00	....	....	....	....	24.00	....	....	....
(39) Wall Plaster, neat, in cloth, 100-lb. sacks, including sacks	per ton	23.00	20.00	20.00	22.00*	25.00*	25.00	22.50*	27.00	26.00*	24.00*	22.00	25.00
(40) Wall Plaster, sanded, in cloth, 100-lb., including sacks	per ton	23.00	21.00	14.00*	21.00*	22.00*	17.00*	17.50*	23.00	22.00*	17.40*	16.80*	20.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb., including sacks	per ton	23.00	19.00	19.00	22.00*	....	25.00*	22.50*	....	26.00	24.00*	....	28.00
(42) Wall Ties, galvanized	per M.	5.00*	5 00	5.00	5.00	3.50*	3.50	6.00	5.00	4.50*	....	5.00	4.00
(43) Wall Plugs	per M.	22.50	25.00	20.00	....	25.00	....	....	....	30.00	....	18.50	26.00
(44) Asphalt Shingle (*singles; †stripped)	per sq.	7.00†	7.00*	....	8.00*	7.50†	9.00	8.00	7.50	8.00†	7.00*	7.45	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.25**	3.00**	....	3.25*	3.25	....	....	3.00	....	3.00*	3.00*	....
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.00§*	3.25§*	3.30§	3.50§	2.90	....	....	....	....	2.10*	3.15§	....
(47) Stucco Board, Medium wt.	per M. sq. ft.	55.00	55.00*	.....	....	....	70.00	....	55.00	55.00	60.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	60.00	60.00	68.00	75.00	65.00	65.00	60.00	....	....	70.00
LUMBER ITEMS									*		*		
(49) Wood Lath, No. 1 (Size 4 ft.)	per M.	12.00	....	....	17.00	....	....	....	12.00	13.00	12.00	10.50*	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	46.00*	....	....	42.00	....	....	....	42.00	46.00	45.00	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	....	....	....	....	45.00	60.00	45.00	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	46.00	....	....	42.00	....	....	....	40.00	44.00	45.00	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	38.00	....	....	42.00	....	....	....	40.00	44.00	40.00	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	70.00	....	....	65.00	....	....	....	65.00	65.00	80.00	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	100.00	....	....	100.00	....	....	....	90.00	100.00	100.00	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	70.00	....	....	....	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	50.00	....	....	60.00	....	....	....	65.00	58.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	130.00	....	....	....	....	....	....	....	170.00	165.00	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	70.00	....	....	70.00	....	....	....	90.00	73.00	90.00	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	60.00	....	....	60.00	....	....	....	70.00	58.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	60.00*	....	....	60.00	....	....	....	....	75.00	80.00*	....	....
(62) Mouldings, Yellow Pine	over list	1.25	....	....	1.25*	....	....	....	....	1.25	1.50*	....	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	6.50	....	....	....	8.00	7.50	7.00	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	5.20	....	....	....	....	7.00	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	7.50	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	6.50	....	....	6.00	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.- 10 in. 12 in., No. 1 Com. Yellow Pine Boards	per M.	46.00*	....	....	....	....	....	....	60.00	60.00	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime (bulk, Item No. 1)—Reading, 80 lb. bu.; (Barreled, item 2)—Newark includes bbls., returned at 10c; (Item 3), finishing; returned bags, 10c; Philadelphia, per bu.; Buffalo, steel drums; (Item No. 3)—Newark, returned bags, 15c each.

Crushed Stone (4)—**Pittsburgh, size 1 in.**

Common Brick (Item 6)—**Philadelphia, f. o. b. job. mfrs. retail price. Buffalo, loads of 1200.**

Flue Lining (Items No. 10, 11)—Erie, (10) 8x8 in., (11) 8x12 in.

Fire Clay (Item 13)—Return bags, Elmira, 15c; Jamestown, none; Pittsburgh, paper sacks, $2.00 extra per ton, in cloth sacks. with no allowance for returned sacks. No credit for returned sacks. Buffalo, Scranton, returned sks., 25c.

Gravel (Item No. 14)—Philadelphia; Scranton, 2400 lb. yd.; Elmira, 2500 lb. yd.; 2000 lb. ton, Reading; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Hollow Building Tile (Item 15-16)—Rochester, 6 cell.

Hair (19)—Lbs. per bu., Pittsburgh, Elmira, 4; Scranton, 7; price per lb., Erie; old stock, Rochester, Pittsburgh, fibre; Allentown Govt. Paterson, per lb.

Paving Block (Item 31)—Buffalo, on application.

Sand (Item 34)—2500 lb. yd., Buffalo; Elmira, 2600 lb. yd.; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Wall Plaster (Items 39, 40, 41)—Returned sacks, 15c, Jamestown, Allentown, Scranton, Pittsburgh, Philadelphia, Buffalo; 20c, Erie; Newark, 15c credit for returned sacks.

Wall Ties (Item 42)—Corrugated.

Allentown, Elmira; per box, Pittsburgh

Roofing, Slate Surf. (Item 45)—70 lbs., Elmira; 75 lbs., Rochester.

Roofing, Smooth Surf. (Item 46)—55 lbs., Elmira, Rochester.

Stucco Board (Item 47)—Rochester, Sheetrock.

(Item 49)—Newark, spruce.

(Item 50)—Elmira, 12 ft. and less.

(Item 61)—Scranton, white pine; Elmira, red cedar; (Item 62)—Jamestown, per 1½ inches; Scranton, per 100 lin. ft., moulding count; (Item 67)—Elmira, 1 in., in., 10in., No. 2 Com.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. MIDDLE AND SOUTHERN ATLANTIC STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Trenton, N. J.	Wilmington, Del. ★	Washington, D. C.	Baltimore, Md.	Norfolk, Va.	Richmond, Va.	Huntington, W. Va.	Fairmont, W. Va.	Wheeling	Atlanta, Ga.
(1) Bulk Lime	per cwt.	$0.60*	$0.90	$0.75	$ 0.51*	....	....	....	....	....	$1.80*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	*	....	2.75	2.50	$2.50	$2.30	$2.80	$2.75	$3.10	2.15
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	*	....	....	....	....	....	....	....	....	...
(4) Crushed Stone	per ton	4.50	3.30	....	4.50	3.00	3.75	....	5.00	7.00	2.50*
(5) Crushed Stone	per yd.	....	4.50	....	3.65	....	....	....	....	....	...
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	22.00	26.00	22.00	25.00*	18.50*	25.00	18.75	30.00	24.00	12.50*
(7) Corner Bead, galvanized	per ft.	.06	.04	.04	.05	.06	.06	.07	.04	.06	.06
(8) Drain Tile, 4 in	per ft.	....	.10	.08	.07	.08	.08	.075	.06	.06	.09
(9) Drain Tile, 6 in	per ft.	....	....	....	.14	.12	.125	.12	.10	.09	.11
(10) Flue Lining, 8½ in. x 8½ in	per ft.	....	.36	.25	.30	.36	.33	.342	.30	.30	.45
(11) Flue Lining, 8½ in. x 13 in	per ft.	.63	.54	.40	.45	.54	.495	.513	.45	.45	.60
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	100.00	80.00	85.00	75.00	80.00	85.00	60.00	60.00	75.00	65.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	25.00	21.00	25.00*	18.00	25.00	20.00*	15.00*	14.00*	12.50*	15.00*
(14) Gravel, washed	per yd.	2.50*	2.80	2.25*	2.50	4.00	4.00	3.00	4.00	2.20*	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	220.00*	....	250.00	310.00*	....	....	200.00	268.00*	230.00	175.20
(16) Hollow Building Tile (8x5x12 in.)	per M.	....	125.00	130.00	125.00	160.00	....	85.00	110.00	100.00	87.60*
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.475	.55	.45	.375	21.00*	18.50*	21 00*	.44	.60	1.90*
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.65	.75	.57	.50	24.00*	23.50*	22.00*	.525	.60	2.75
(19) Hair	per bu.	.45	.42	.50	.50	.60	.50	....	.12*	.75	1.00*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.38	.40	.32	.355	.40	.35	.38	.36	.38	.41
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	.37	.35	.43	.305*	....	.35*	35	....	.40	.345
(22) Mortar Color, red	per lb.	.04	.04	.06	.035	.05	.04	....	.0265	.035	.0225
(23) Mortar Color, buff	per lb.	.04	.04	.07	.035	.05	.06	.03	.037	.035	....
(24) Mortar Color, double strength black	per lb.	.10	.12	.10	.06	.15	.06	.05	....	.04	.04
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	140.00	120.00	147.50*	180.00	140.00	100.00	....	110.00	140.00
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	150.00	120.00	157.50*	180.00	150.00	115.00	121.50	120.00	150.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	.15	.17	.15	.15	....	.18	.15	....	....	...
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.18	.19	.17	.18	....	.20	.17	....	....	...
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.40	3.60	3.00	2.87	3.70	3.15	3.50	3.20	2.90	3.50
(30) Extra charge for each cloth sk.	per sk.	.10	.25	.10	.07	.075	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	65.00*	50.00	....	50.00	....	60.00	32.00*	....	....	....
(32) Plaster Board, ⅜ in. thick	Per M. sq. ft.	35.00*	40.00	32.00	37.50	....	40.00	42.50	35.00	42.50	42.50
(33) Sand (Building)	per ton	2.00	2.35	1.55	2.00	2.00	2.75	....	3.50	2.40	....
(34) Sand (Building)	per yd.	....	2.80	2.00	2.50	2.50	3.00	2.25	....	....	1.25
(35) Sewer Pipe, single strength, off list	per cent.	30%	35%	25%	50%	40%	45%	43%	50%	45%	40%
(36) Wall Coping, 9 in	per ft.	.28	.26	.24	.26	.24	.22	.228	.20	.22	.35
(37) Wall Coping, 13 in	per ft.	.42	.39	.36	.39	.36	.33	.342	.30	.33	.45
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	22.00	20.00	....	....	....	24.00	22.00*	....	21.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks	per ton	....	23.50	22.50*	20.25	22.50*	23.00*	24.00*	22.00*	23.00*	25.00*
(40) Wall Plaster, sanded, in cloth 100 lb. sks., inc. sks	per ton	....	24.00	23.00*	21.50	22.50*	23.00*	24.00*	....	16.00	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. sks., inc. sks	per ton	....	25.00	23.00*	27.00	22.50*	23.00*	24.00*	22.00*	23.00*	....
(42) Wall Ties, galvanized	per M.	4.50	5.00	5.00	5.00	5.00	5.00	4.00	4.00	5.00	4.25
(43) Wall Plugs	per M.	....	25.00	28.00	25.00	....	....	20.00	....	16.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	8.00†	8.50	7.50	6.30†	....	....	8.00*	7.50*	7.75*	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.50*	....	3.00†*	3.10**	6.00†	....	3.25*	2.75†*	3.00**	2.75§
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.75†	....	2.90§*	2.65§	4.50†	....	3.75§	3.00§*	2.80§*	2.70§
(47) Stucco Board, Medium wt	per M. sq. ft.	....	....	75.00	....	60.00	65.00	....	60.00*	55.00	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	65.00	68.00	....	....	....	....	....	...	....	....
LUMBER ITEMS				*	*	*					
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	12.00*	....	6.75	14.00	6.50	6.00	8.50	....	....	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	....	....	35.00	55.00	35.00	....	40.00	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	55.00	....	80.00	....	50.00	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	55.00	....	40.00	....	40.00	....	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	33.00	51.00	30.00	....	....	....	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	....	....	60.00	100.00	70.00	....	65.00	....	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	....	....	75.00	....	85.00	....	70.00	....	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	....	70.00	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	55.00	....	50.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	....	....	....	150.00	....	160.00	....	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	....	65.00	100.00	70.00	....	75.00	....	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	....	....	50.00	....	45.00	....	55.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	....	....	75.00	....	....	....	....	....
(62) Mouldings, Yellow Pine	over list	....	....	....	....	1.00	....	1.25	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	....	....	....	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	15.00	....	8.00*	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in. 12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	....	60.00	40.00	....	58.50	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags.

Lime (bulk, Item No. 1)—Baltimore, per bu.; Atlanta, bbl. of 3 sacks; Trenton, 70 lb. bu. **(Barreled)** Trenton, not handled locally, supply from Philadelphia. **Hydrated** (Items 17, 18)—Ton lot price, Richmond, Norfolk, Huntington; Atlanta, barrel price.

Crushed Stone (Item No. 4, 5)—Atlanta, 2,600 lb. yd.

Common Brick (6)—Baltimore, f. o. b. job, mfrs. ret. price. Atlanta, f. o. b. Atlanta; Norfolk, $18.50 to $19.00 a/c different zones.

Fire Clay (13)—Washington, Atlanta, no credit for sacks; Wheeling, 15c credit for sacks; Fairmont, Huntington, 10c credit for sacks; bulk only, Richmond.

Gravel (14)—Washington, 2,700 lb. yd.; ton price only, Trenton, Wheeling, Washington.

Hollow Bldg. Tile (Item 16)—Atlanta, back up tile, 2 cell, carload price; Trenton, Baltimore, Fairmont, load bearing.

Hair (19)—Bu. of 4 lb., Atlanta; Fairmont, per lb.

Metal Lath (Item 21)—Richmond, Baltimore, Gauge No. 27.

Partition Tile (25, 26)—Baltimore, little demand.

Paving Block (31)—Huntington, culls; Trenton, known as paving brick.

Plaster Board (Item 32)—Trenton, carloads.

Wall Plaster (Items 38, 39, 40 41)—Sacks, 15c credit, Washington, Wheeling, Huntington, Atlanta, Fairmont; sacks 14½c credit, Richmond; returned sacks, 10c. Norfolk.

Roofing, Slate Surf. (Item 45)—80 lb., Washington, Baltimore; 85 lb., Fairmont; Wheeling, 85 lbs.

Roofing, Smooth Surf. (Item 46)—55 lb., Washington, Fairmont; Wheeling, rolls, 55 lbs.

Stucco Board (Item 48)—Creosoted, Fairmont.

(Item 49)—Spruce, Trenton.

(Item 65)—Huntington, XAXRC.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

SOUTHERN AND SOUTHWESTERN STATES

Item	Miami, Fla.	Tampa,★ Fla.	St. Petersburg	Louisville	Lexington	Memphis, Tenn.	Nashville, Tenn.	Birmingham,★ Ala.	New Orleans, La.	El Paso, Tex.	Houston
(1) Bulk Lime.....per cwt.	....	....	....	$0.70	$1.00*	....	$0.60*	....	$0.87	$0.625	$0.95*
(2) Barreled Lime, 180 lbs. (net) bbls.....per bbl.	$3.30	2.25	$2.75	$2.35*	2.75	$2.00	2.45	$2.25	2.10	2.25	3.00
(3) Barreled Lime, 280 lbs. (net) bbls.....per bbl.	....	....	....	....	....	....	4.00	....	....	....	....
(4) Crushed Stone.....per ton	....	....	....	....	3.50	....	....	....	....	....	....
(5) Crushed Stone.....per yd.	2.75	7.00	5.75	....	....	2.75*	3.15	....	....	....	3.65
(6) Common Brick, standard quality and sizes (8x2¼x3¾) per M.	28.00	20.00*	18.00	19.00	18.00	14.50	18.00	23.00	15.00	16.00	19.00
(7) Corner Bead, galvanized.....per ft.	.07	.05	.07	.05	.08	.06	.05	.07	.07	.06	.045
(8) Drain Tile, 4 in.....per ft.	.12	....	....	.045	.10	.07	.08	.07	.075	....	.13
(9) Drain Tile, 6 in.....per ft.	....	....	....	.084	....	.10	.14	.15	.12	....	.18
(10) Flue Lining, 8½ in x 8½ in.....per ft.	.40	.40	.45	.27	.42	.34	.30	.30	.30	....	.44
(11) Flue Lining, 8½ in. x 13 in.....per ft.	.60	.60	.58	.405	.63	.51	.45	.40	.42	....	.65
(12) Fire Brick, Standard 9-in. No. 1 clay.....per M.	85.00	80.00	76.00	70.00	80.00	62.00	65.00	80.00	61.10	90.00*	65.00
(13) Fire Clay, in 100-lb. cloth bags, including bags.....per ton	40.00*	20.00	40.00	15.00*	30.00	20.00*	23.00*	20.00*	15.98	....	20.00*
(14) Gravel, washed.....per yd.	.	...	...	....	3.65	3.25	2.25	....	3.30	....	3.75
(15) Hollow Building Tile (8x12x12 in).....per M.	280.00	280.00	230.00	227.40	198.00	230.00	250.00*	....	220.00	240.00	236.60*
(16) Hollow Building Tile (8x5x12 in).....per M.	180.00	137.50	120.00	110.30	100.00*	120.00	111.20	116.00	....	90.00	103.10*
(17) Hydrated Lime (masons) in 50-lb. paper bags.....per bag	75	60*	.80	50	75	.50	.55	.62	.53	.60	.50*
(18) Hydrated Lime (finishing) in 50-lb. paper bags.....per bag	.85	.75*	.80	.65	.75	60	.70	.62	.62	....	.50*
(19) Hair.....per bu.	1.00	.75	.75	75	....	.60	.55	.50	.56	....	85
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡.....per yd.	.38*	.45	.52	.45	.40	.35	.40	.40	.38	.37	.401
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.....per yd.	.48*	.31*	.42	....	.40	....	....	.42	.38	.40*	....
(22) Mortar Color, red.....per lb.	.055	.04	.04	.035	.03	.02	.05	.05	.05	.035*	.0325
(23) Mortar Color, buff.....per lb.	.06	.04	.06	.045	....	.03	.08	.025	.05	.0375*	.04
(24) Mortar Color, double strength black.....per lb.	.08	.07	.06	.06	....	.045	.16	.08	.06	.045*	.0475
(25) Partition Tile, Clay (3x12x12 in.).....per M.	....	....	....	101.10	100.00	130.00	111.20	170.00	126.90	120.00	128.00*
(26) Partition Tile, Clay (4x12x12 in.).....per M.	....	....	160.00	113.70	111.00	145.00	125.10	138.50	131.60	120.00	133.70*
(27) Partition Tile, Gypsum (3x12x30 in.).....per ft.	....	....	....	....	....	....	.1375	.20	.12	.125	.13
(28) Partition Tile, Gypsum (4x12x30 in.).....per ft.	....	....	....	....	....	....	.165	25	....	....	.165
(29) Portland Cement, 4 sacks to bbl., (excluding sks.) per bbl.	4.40	3.40	3.60	2.70	4.28	3.20	4.00	3.90	3.20	3.50	3.35
(30) Extra charge for each cloth sk.....per sk.	.10	.10	.05	.10	.08	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.).....per M.	....	....	...	....	....	....	....	34.00	40.40	....	....
(32) Plaster Board, ⅜ in. thick.....per M. sq. ft.	60.00*	40.00	41.00	50.00	50.00	52.50*	44.00	65.00	41.36	....	60.00
(33) Sand (Building).....per ton	....	....	1.00	....	3.75	....	....	1.85	....	1.75	1.75
(34) Sand (Building).....per yd.	1.60	3.50	1.40	....	4.50	2.17	3.00	1.85	1.88	1.75	1.60
(35) Sewer Pipe, single strength, off list.....per cent.	*	20%*	*	55%	35%	....	50%	30%	*	....	*
(36) Wall Coping, 9 in.....per ft.	....	....	....	55%	35%	.21	.20	.25	.16	....	.31
(37) Wall Coping, 13 in.....per ft.	....	....	....	55%	30%	.30	.30	.35	.23	....	.44
(38) Wall Plaster, neat, in paper, in 80-lb. bags.....per ton	....	22.00	....	....	....	....	....	24.00	....	16.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. sks., inc. sks.....per ton	29.00	24.00	26.50	25.00	28.00	24.00*	27.00	24.00*	22.36	18.00*	25.00*
(40) Wall Plaster, sanded, in cloth, 100-lb., inc. sks.....per ton	....	..	....	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloth, 100-lb., inc. sks.....per ton	29.00*	....	26.50	25.00	....	24.00*	....	26.00*	....	18.00*	....
(42) Wall Ties, galvanized.....per M.	5.00	4.00	5.00	4.00*	5.00	4.50	5.00	4.50	4.75	4.10*	5.25*
(43) Wall Plugs.....per M.	....	....	....	30.00	....	18.50	22.50	....	....	....	30.00
(44) Asphalt Shingle (*singles; †stripped).....per sq.	10.00	8.50*	8.00†	6.25	....	7.50*	8.00*	9.15	7.00	....	10.00
(45) Roofing Slate Surf. (*heavy, †extra heavy).....per sq.	4.00**	3.25	3.50†	3.00†	4.00*	2.80†	3.25†*	4.00	3.00	4.50*	4.00**
(46) Roofing Smooth Surf. (*light, †medium, §heavy).....per sq.	3.50§	3.50§	3.25§	3.25†	3.75§	2.85§	3.10§*	3.00	2.50	4.25§	3.50§*
(47) Stucco Board, Medium wt.....per M. sq. ft.	....	65.00*	....	60.00	....	....	....	60.00	....	....	....
(48) Stucco Board, Narrow Key.....per M. sq. ft.	....	9.50*	....	....	....	....	....	....	....	....	....
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.).....per M.	11.00*	9.50*	10.00*	....	....	6.00*	7.25	7.00	6.35	9.00	6.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.....per M. Board ft.	35.00	45.00	....	....	....	30.00	42.50	36.00	55.00	47.50	37.50*
(51) 1x10 No. 1 Shiplap, Y. P., all lengths.....per M. Board ft.	90.00	60.00	....	....	....	....	50.00	70.00	75.00	50.00	40.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths.....per M. Board ft.	40.00	45.00	....	....	....	32.50	40.00	49.00	55.00	40.00	28.00
(53) 1x4 No. 2 Sheathing.....per M. Board ft.	40.00	40.00	....	....	....	30.00	40.00	35.00	48.00	40.00	25.00
(54) 1x4 "B" Flooring.....per M. Board ft.	65.00	60.00	....	....	....	60.00	55.00	60.00	90.00	58.50	50.00
(55) Yellow Pine Clear Finish.....per M. Board ft.	80.00	100.00	....	....	....	75.00	90.00	80.00	....	80.00	65.00
(56) 1x6 "B&Btr" Drop Siding.....per M. Board ft.	65.00	70.00	....	....	....	....	80.00	70.00	90.00	....	50.00
(57) 1x6 No. 1 Common Drop Siding.....per M Board. ft.	55.00	50.00	....	....	....	50.00	37.50	55.00	75.00	55.00	40.00
(58) Cypress Finish Lumber.....per M. Board ft.	180.00	150.00	....	....	....	150.00	175.00	....	190.00	....	150.00*
(59) ¾x4 "B" Partition.....per M. Board ft.	70.00	100.00	....	....	....	60.00	60.00	70.00	90.00	80.00	70.00
(60) ½x4 "B" Ceiling.....per M. Board ft.	50.00	50.00	....	....	....	55.00	52.50	60.00	80.00	....	40.00
(61) ½x5 Clear Rdwd. Bevel Siding.....per M. Board ft.	80.00*	80.00	....	....	....	....	....	....	85.00	....	65.00*
(62) Mouldings, Yellow Pine.....over list	1.25	1.50	....	....	....	*	10%	1.00	....	25%	*
(63) Washington 16 in., 5/2 Clears.....per M.	9.50	....	....	....	....	7.50	6.50	8.00	....	....	7.00
(64) Washington 16 in., 5/2 Clears.....per sq.	....	....	....	....	....	....	....	....	....	....	6.25
(65) Canadian 16 in., 5/2 xxxxx Clears.....per M.	....	....	....	....	....	....	....	8.75	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears.....per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Yellow Pine Boards...per M	90.00	60.00*	....	....	....	60.00	....	60.00	60.00	50.00	40.00*

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime (Item No. 1, bulk)—Nashville, 80 lb. bu. Lexington, 70 lbs.; Houston c/L f. o. b. Houston. **Barreled Lime,** (Item 2 and 3), Louisville, blue river lime. **Hydrated** (Items 17, 18)—Tampa, 40 lb. bags, Florida lime, 60c; Houston, 40 lb. bags.

Crushed Stone (Item 4-5)—Memphis, f. o. b. cars, per ton.

Common Brick (Item 6)—Tampa, Ala. and Ga. Red.

Fire Brick (Item 12)—Carload lots, El Paso.

Fire Clay (Item 13)—15c credit, Nashville; no credit, Louisville, Birmingham, Houston, Miami, Memphis.

Hollow Building Tile (15, 16)—Houston, Interlocking tile, $134.00 per M; Lexington, f. o. b. cars; Nashville, load bearing; Houston, car loads.

Metal Lath (Item 21)—El Paso, Gauge No. 27; Miami, Gauge 26, galvanized, per sq. yd.; (Item 20)—Black Painted Expanded Key Lath, Gauge 27; Tampa, Gauge 27.

Mortar Color (Item 22, 23, 24)—El Paso, barreled lot price.

Partition Tile Clay (Items 25, 26)—Houston, mfrs. price.

Plaster Board (Item 32)—Miami, Memphis, ¼ inch.

Sewer Pipe (Item 35)—St. Petersburg, net; Houston, various per cent. off list; New Orleans, Miami list; Tampa, less.

Wall Plaster (38, 39, 40, 41)—15c sacks, Birmingham, El Paso, Memphis, Miami; hair fibre. Houston, gross ton, 15c sacks.

Wall Ties (42)—Corrugated, El Paso, Louisville, Houston.

Roofing, Slate Surf. (Item 45)—85 lbs. Miami, Nashville, Houston.

Roofing, Smooth Surf. (Item 46)—55 lbs., Nashville, Houston.

Stucco Board (Item 47-48)—Tampa, creosoted.

(Item 49)—Memphis, yellow pine; Miami, Houston, Tampa, St. Petersburg, cypress; **(Item 50)**—Houston, 20 ft. average; **(Item 58)**—Houston, $115.00 to $300.00; **(Item 61)**—Houston, pine; Miami cypress; **(Item 62)**—Memphis, Houston, list; **(Item 67)**—Houston, 6 in., 8 in. and 10 in., $45.00, 12 in., $55.00; Tampa, $60.00 to $80.00.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

SOUTHWESTERN AND CENTRAL STATES

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Dallas, Tex.	Topeka, Kan.	Little Rock, Ark.	Okla. City, Okla.	Cincinnati, O.	Cleveland	Columbus	Toledo	Detroit, Mich.	Evansville, Ind.
(1) Bulk Lime	per cwt.	....	....	....	$1.10	$1.05	$1.10	$0.50	$0.95	$1.00	$0.90
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$2.75	$3.25	$3.00	3.25	3.25	3.45	2.50	....	....	2.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	....	....	....	3.60	2.90*	3.60	3.00*	3.70	3.00	....
(5) Crushed Stone	per yd.	....	....	....	....	....	4.50	...	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	20.00	35.00	12.50*	18.00	18.00*	15.00	18.00	19.00	18.00	14.00
(7) Corner Bead, galvanized	per ft.	.475	....	.06	.07	.06	.06	.06	.04	.05	.04
(8) Drain Tile, 4 in	per ft.	.15	.065	.10	.10	.0708	.047	.055	.06	.07	.03
(9) Drain Tile, 6 in	per ft.	.20	.11	.15	.05	.125	.076	.09	.089	.13	.045
(10) Flue Lining, 8½ in. x 8½ in	per ft.	.55	.55	.55	.40	.348	52%*	.30	47%*	.33	.32
(11) Flue Lining, 8½ in. x 13 in	per ft.	.80	.80	.70	.55	.522	52%*	.45	47%*	.495	.48
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	80.00	....	80.00	70.00	68.00	55.00	65.00	63.00	70.00	60.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	30.00	....	25.00*	25.00	.90‡*	12.00*	.85*	11.00	13.00	15.00
(14) Gravel, washed	per yd.	....	....	....	3.25*	2.75*	....	1.25*	2.30	3.50	1.80
(15) Hollow Building Tile (8x12x12 in.)	per M.	257.00	300.00	....	....	142.50	153.00	174.10	....	200.50	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	112.50*	115.00	....	93.00	72.75	62.00	....	90.00	93.40	70.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.60*	.65	.75	.75	.49	.40	.40	.50	.50	.60
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.55*	....	.75	.75	.55	.45	.45	.52	.50	.60
(19) Hair	per bu.	.85	....	1.00	....	.55	.75	.75	.75	.20*	.60
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.391	.40	.45	.466	.41	.40	.40	.36	.38	.35
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	....	....	.46	....	....	.35*	....	.40	....	.34
(22) Mortar Color, red	per lb.	.04*	.06	.03	.03	.025	.0215	.025	.04	.03	.025
(23) Mortar Color, buff	per lb.	.04*	.06	.045	.04	.036	.0315	.03	.04	.05	.03
(24) Mortar Color, double strength black	per lb.	.095	....	.05	.07	.065	.049	.05	.05	.06	.055
(25) Partition Tile, Clay (3x12x12 in.)	per M.	135.00	130.00	140.00	....	70.00*	71.00	86.35	110.00	100.35	77.50
(26) Partition Tile, Clay (4x12x12 in.)	per M.	145.00*	....	160.00	....	89.00*	81.00	92.90	125.00	107.00	80.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	.13	....	....	....	.17	.17	.15	.145	.16	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.1525	....	....	....	.18	.21	.18	.17	.185	....
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	3.20	3.40	4.20	3.80	3.28	2.92	3.00	3.20	3.20	2.80
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.10	.10	.10	.10	.08	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	....	....	....	40.00	45.00*	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	65.00*	45.00	35.00	45.00	50.00	40.00	40.00	.30*	37.00	40.00
(33) Sand (Building)	per ton	....	....	....	2.60	2.25*	2.75	3.50	2.00	3.50	....
(34) Sand (Building)	per yd.	4.00	....	1.00*	....	2.30*	....	3.50	....	....	1.80
(35) Sewer Pipe, single strength, off list	per cent.	20%	....	....	...	40%	52%	50%	47%	45%	50%
(36) Wall Coping, 9 in	per ft.	.40	....	.35	.37	.24	52%*	45%*	47%*	35%*	.22
(37) Wall Coping, 13 in	per ft.	.55	....	.45	.40	.36	52%*	45%*	47%*	35%*	.32
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	....	....	20.00	23.25	20.00	17.00	....	24.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sacks, including sacks	per ton	21.00	21.00	27.00*	22.00	25.00	22.00*	....	....	21.00*	23.00
(40) Wall Plaster, sanded, in cloth, 100 lb., including sacks	per ton	....	....	....	....	....	12.50	16.00*	13.00*	15.00*	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb., including sacks	per ton	21.50	....	27.50*	22.00	25.00	22.00	....	15.60‡	21.00*	23.00
(42) Wall Ties galvanized	per M.	5.00	....	4.75	4.00	4.75	3.60	2.50	3.00	3.00	2.50
(43) Wall Plugs	per M.	22.50	....	25.00	30.00	....	....	....	15.00	....	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	10.00	8.50	8.50*	7.00*	8.50*	6.25*	7.00†	7.25†	6.50†	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	4.50*	4.00**	3.40†	3.50†	....	3.40†	3.00†	3.25†	3.00**	3.00*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	4.25§	4.00§	3.00§	3.00§	....	2.90§	2.25§	2.75§	2.40§*	2.75§*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	....	....	....	....	60.00	60.00	60.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	....	....	....	60.00	70.00	60.00	60.00	....
LUMBER ITEMS				*							
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	11.00*	10.00	6.00	....	7.25	12.50*	9.00*	12.75*	12.00	7.50*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	37.50	40.00*	32.00	....	....	47.00	42.50	45.00	45.00	40.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	45.00	40.00	45.00	....	....	47.00*	....	....	70.00	50.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	30.00	40.00	32.00	....	....	40.00*	42.50	43.00	45.00	37.50
(53) 1x4 No. 2 Sheathing	per M. Board ft.	25.00	40.00	28.00	....	....	47.00	37.50	36.00	40.00	35.00
(54) 1x4 "B" Flooring	per M. Board ft.	50.00	60.00	50.00	....	....	81.00*	65.00	70.00	75.00	60.00
(55) Yellow Pine Clear Finish	per M. Board ft.	65.00	90 00	70.00	....	....	95.00	90.00	100.00	135.00	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	47.00	55.00	60.00	....	....	70.00	60.00	....	....	65.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	42.50	....	45.00	....	....	63.00	50.00	55.00	50.00*	50.00
(58) Cypress Finish Lumber	per M. Board ft.	170.00	140.00	....	....	....	122.00	140.00	120.00	160.00	150.00
(59) ¾x4 "B" Partition	per M. Board ft.	75.00	....	65.00	....	....	95.00	65.00	65.00*	75.00	75.00
(60) ½x4 "B" Ceiling	per M. Board ft.	50.00	50.00*	50.00*	....	....	63.00*	55.00	50.00	65.00	50.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	65.00*	60.00	50.00*	....	....	63.00	55.00	64.00	70.00	60.00
(62) Mouldings, Yellow Pine	over list	*	....	25%	....	....	1.30*	1.25	1.25*	1.25	25%
(63) Washington 16 in., 5/2 Clears	per M.	6.50	5.50	....	....	....	7.70	6.50	6.50	7.00	6.00
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	4.80
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	8.00	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	50.00	65.00	....	....	....	63.00	60.00	65.00	70.00	50.00

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) **Means no cloth bags used.**

Lime, Hydrated (Item 17, 18)—Dallas, 40 lb. bags.

Crushed Stone (4)—Columbus, f. o. b. tipple stone at quarries; Cincinnati, bowlders.

Common Brick (6)—Little Rock, Cincinnati, f. o. b. cars.

Flue Lining (10, 11)—Per cent. off list, Toledo, Cleveland.

Fire Clay (Item 13)—Cincinnati, Cleveland, paper; Columbus, price per sack; single sack rate, no credit on returned sacks, Little Rock.

Gravel (14)—Columbus, tipple, per ton; Cincinnati, Okla. City, per ton.

Hollow Building Tile (Item 15-16)—Dallas (Item 17), Interlocking Tile, $125.00 per M.

Hair (19)—Detroit, per lb.;

Metal Lath (Item 21)—Cleveland, Gauge No. 26.

Mortar Colors (Items 22-23-24) Dallas. paste.

Partition Tile, Clay (25, 26)—Cincinnati, carload lots, f. o. b. cars; Dallas, mfrs. price.

Paving Block (Item 31)—Toledo No. 2 quality.

Plaster Board (Item 32)—Per sheet, 32x36 ft., ⅜ in. thick, Toledo; Dallas, sheetrock.

Sand (33, 34)—Cincinnati (33) concrete and (34) fine; Little Rock, f. o. b. yard.

Wall Coping (36, 37)—Per cent. off list, Toledo, Detroit, Columbus, Cleveland.

Wall Plaster (39, 40, 41)—Returned sacks, 15c, Cleveland, Evansville, Little Rock; sacks, 12c each, Detroit; Columbus, 80 lb. paper; Toledo, 8c sacks.

Roofing, Slate Surf. (Item 45)—85 lbs. Topeka; 80 lbs. Detroit.

Roofing, Smooth Surf. (Item 46)—55 lbs., Detroit, Evansville.

(Item 49) — Dallas, Cypress; Cleveland, white pine; Toledo, hemlock; Evansville, pine; Columbus, chestnut. (Item 50)—Topeka, white pine; (Item 51)—Cleveland, No. 2 Commercial; (Item 52)—Cleveland, No. 3; (Item 54)—Cleveland, No. 1 C.; (Item 57)—Detroit, No. 2. (Item 59)—Toledo, Select Com. Cypress D4S; (Item 60)—Cleveland, ⅝ in.; Little Rock, ⅝x4 in.; Topeka, ⅜ inch only. (Item 61)—Little Rock, Y. P.; Dallas, Cypress; (Item 62)—Cleveland, Toledo, per 100 inches; Dallas, list.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

		INDIANA				ILLINOIS			
Item	Unit	Ft. Wayne††	Indianapolis	South Bend	Terre Haute	Bloomington, Ill.	Chicago	Moline	Peoria
(1) Bulk Lime	per cwt.	$2.70*	$0.90	$2.35*	....	....	$1.50*	$0.90	..
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	....	....	2.75	....	$2.75	2.40	1.80	$2.75
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	4.50	....	$3.00	4.00	....	....	....
(5) Crushed Stone	per yd.	....	4.50	....	....	....	3.00	3.75	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	18.00	17.00	20.00	18.00	22.00	12.00	19.00	16.00
(7) Corner Bead, galvanized	per ft.	.06	.05	.06	.06	.06	.04	.06	....
(8) Drain Tile, 4 in	per ft.	.05	.06	....	....	.05	.06	.085	.0697
(9) Drain Tile, 6 in	per ft.	.07	.12	.04	....	.09	.10	.12	.12
(10) Flue Lining, 8½ in. x 8½ in	per ft.	.36	.70	.36	.325	.35	.27	.40	.40
(11) Flue Lining, 8½ in. x 13 in	per ft.	.54	1.05	.54	.50	.55	40	.45	.50
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	70.00	70.00	55.00	60.00	75.00	.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	13.00*	11.00	15.00*	15.00*	20.00*	2.00*	16.00	15.00
(14) Gravel, washed	per yd.	....	....	2.25	3.00*	4.45*	3.00	3.15	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	....	....	240.00	....	....	187.50	....	126.00
(16) Hollow Building Tile (5x8x12 in.)	per M.	95.00	85.00	115.00	....	100.00	93.75	92.00	63.75
(17) Hydrated Lime (masons) in 50-lb. paper bags	per bag	.65	.52	.525	.50	.65‡	.45	.525	.50
(18) Hydrated Lime (finishing) in 50-lb. paper bags	per bag	.65	.60	.575	.60	.65‡	.50	.625	.57
(19) Hair	per bu.	.80	.40	.60	....	....	.50	.80	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.44	.36	.40	.40	....	.31	.38	.61
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	.42*	.32	.39	.40	.35	.30	.38	....
(22) Mortar Color, red	per lb.	.03*	.03*	.05	.04	.05	.05*	.05	.03
(23) Mortar Color, buff	per lb.	.04*	.04*	.05	.04	.05	.05*	.055	.04
(24) Mortar Color, double strength black	per lb.	.06*	.05*	.06	.05	.07	.05*	.07	.06
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	96.00	80.00	....	....	93.75	....	....
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	110.00	85.00	....	....	100.00	....	....
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	.153	....	....	....	.13	.14	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	.191	....	....	....	.15	.16	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.40	3.60	3.20	3.00	3.20	2.55	2.90	3.20
(30) Extra charge for each cloth sk	per sk.	.25	.07	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	50.00	....	50.00	....	....	....	38.00	....
(32) Plaster Board, ⅜-in. thick	per M. sq. ft.	60.00	40.00	37.50	45.00	45.00	35.00	60.00	50.00
(33) Sand (building)	per ton	3.00*	....	....	....	3.50	....	....	....
(34) Sand (building)	per yd.	....	3.00	2.25	3.00*	4.00*	2.75	2.05	....
(35) Sewer Pipe, single strength, off list	per cent.	40%	40%	50%	50%	40%	55%	42%	20%
(36) Wall Coping, 9 in	per ft.	.26	.25	.24	50%*	.25	.18*	.27	.25
(37) Wall Coping, 13 in	per ft.	.39	.40	.36	50%*	.35	.27*	.36	.35
(38) Wall Plaster, neat, in paper, in 80-lb. bags	per ton	22.50	21.25	21.00	20.00	20.00	....	20.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. incl. sks	per ton	....	23.00‡	23.00‡	23.00	23.00*	18.00*	19.00	22.70
(40) Wall Plaster, sanded, in cloth, 100-lb. incl. sks	per ton	....	12.00‡	....	....	23.00	15.00	....	16.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb. incl. sks	per ton	23.75*	22.50‡	21.00‡	23.00	23.00*	18.50*	20.00	22.70
(42) Wall Ties, galvanized	per M.	4.75	3.00	3.75	3.50	5.00	3.25	4.50	4.00
(43) Wall Plugs	per M.	30.00	25.00	25.00	....	10.00	23.00	23.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	7.00†	8.50	7.00	7.00*	8.00*	7.50*	7.50	7.50*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.25†	3.25*	4.00	3.50*	3.75**	3.00	3.50*	3.25†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.00§	3.25§	2.50	3.00§	3.50**	.....	3.50§	2.75§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	55.00	60.00	60.00	55.00	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	60.00	....	....	60.00	....	....
LUMBER ITEMS									
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	7.00*	11.25	12.00	12.00	12.50*	10.00	9.60	12.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	47.00	35.00	45.00	47.00	45.00	....	43.00	48.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	55.00	55.00	....	60.00	60.00	....	56.00	50.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	42.00	40.00	45.00	45.00	40.00	....	42.00	45.00
(53) 1x4 No. 2 Sheathing	per M. Board ft.	40.00	35.00	45.00	40.00	40.00	....	40.00	45.00
(54) 1x4 "B" Flooring	per M. Board ft.	70.00	60.00	75.00*	78.00	65.00	....	75.00	74.00
(55) Yellow Pine Clear Finish	per M. Board ft.	100.00	125.00	110.00*	90.00	75.00	....	88.00	88.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	70.00	60.00	....	70.00	65.00	....	65.00	65.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	65.00	55.00	65.00	60.00	65.00	....	57.00	....
(58) Cypress Finish Lumber	per M. Board ft.	150.00	150.00	150.00	170.00	135.00	....	165.00	138.00
(59) ¾x4 "B" Partition	per M. Board ft.	85.00	60.00	90.00	70.00	75.00	....	75.00	79.00
(60) ½x4 "B" Ceiling	per M. Board ft.	65.00	55.00	....	60.00	50.00	....	60.00	69.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	65.00	65.00	60.00	60.00	60.00	....	54.00	72.00
(62) Mouldings, Yellow Pine	over list	50%	20%	....	25%	.10%	....	25%	....
(63) Washington 16 in., 5/2 Clears	per M.	6.50	7.00	....	7.00	7.00	....	6.00	7.00
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	7.25	....	....	....	7.00	....	....	7.00
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq	....	....	7.00	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	65.00*	55.00	65.00	65.00	60.00	....	56.00	60 00*

††Ft. Wayne—5% discount to contractors and manufacturers for payment on or before 10th of month following purchase, except shingles, roofing and common brick, on which regular 2% discount will be allowed.

*(Above Item 49)—No lumber revisions received for this issue from this city.

‡Means no cloth bags used.

Lime (bulk, Item 1) — Ft. Wayne, price of three 70 lb. sacks; South Bend, 5% discount c. l. only; per bbl., 200 lb., Chicago.

Fire Clay (13)—Returned sacks 15c, South Bend, Bloomington; sacks 25c, Ft. Wayne; paper sacks, Chicago; paper sacks, Terre Haute.

Gravel (14)—Terre Haute, 3000 lb. yd.; Bloomington, 2500 lb. yd.

Metal Lath (Item 21)—Ft. Wayne, Gauge 26.

Mortar Color (22, 23, 24)—Ft. Wayne, in 100 lb. sacks, broken 1c more; Indianapolis, Chicago, 100 lb. lots.

Sand (33, 34)—Terre Haute, 2600 lb. yd.; Bloomington, 2500 lb. yd.; Ft. Wayne, washed.

Wall Coping (36, 37)—Per cent. off list, Terre Haute; Chicago, double slant.

Wall Plaster (38, 39, 40, 41)—Returned sacks, 15c, Bloomington, Chicago; Fort Wayne, paper.

Roofing, Slate Surf. (Item 45)—85 lbs., Bloomington.

Roofing, Smooth Surf. (Item 46)—60 lbs., Bloomington.

(Item 49)—Bloomington, Peoria, cypress; Ft. Wayne, yellow pine; **(Item 54)**—South Bend "B & Btr." **(Item 55)**—South Bend, Rough. **(Item 67)**—Ft. Wayne, $60.00 to $70.00; Peoria, $50.00 to $60.00.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

NORTH CENTRAL STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.
An asterisk (*) after a figure, refers to note below.
A star (★) after city name, denotes no revisions received.

Item	Unit	Green Bay, Wis.	Milwaukee	Minneapolis St. Paul, Minn.	Davenport, Ia.	Des Moines	Sioux City	Kansas City, Mo.	St. Louis, Mo.	Lincoln, †† Neb.	Denver, Colo.
(1) Bulk Lime	per cwt.	$2.00	$1.60	$1.80*	$2.00	....	$1.30*	$1.00	$0.70	....	$1.00*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	....	2.00	2.80*	3.50	$2.985	2.50	2.80	2.50	$2.80	3.10*
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	2.75	2.60*	....	....	4.50	5.00	....	2.40	3.50*	....
(5) Crushed Stone	per yd.	....	....	....	3.00	....	....	....	3.35	4.73*	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	14.00	16.50*	18.00	20.00	22.00	19.50	22.00	17.00*	17.25	14.00
(7) Corner Bead, galvanized	per ft.	.05	.05	.04	.05	.04	.045	.05	.0375	.05	.05
(8) Drain Tile, 4 in	per ft.	.04	.07	.07	.07	.08	....	....	.08	.08	.08
(9) Drain Tile, 6 in	per ft.	.055	.08	.09	.11	.10	....	.0625	.14	.10	....
(10) Flue Lining, 8½ in. x 8½ in	per ft.	.33	.30	.35	.35	.40	.35*	.27	.28	.40	....
(11) Flue Lining, 8½ in. x 13 in	per ft.	.495	.45	.50	.50	.575	.52*	.40	.43	.60	....
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	55.00*	75.00	65.00	58.00	67.50	70.00*	55.00	47.00	62.50	40.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	15.00*	20.00	12.00	15.00	16.00*	20.00*	10.00	13.50	25.00	10.50
(14) Gravel, washed	per yd.	2.40*	2.40*	2.25	2.10	2.95*	5 00	4.50	2.50*	....	2.00
(15) Hollow Building Tile (8x12x12 in.)	per M.	225.00	190.00	.	..	....	201.00	....	....	....	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	110.00	120.00	100.00	123.00	85.00	100.00	100.00	85.00	73.50	100.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.50	.50	.55	.60	.605	.75	.70	.50	.70	.55
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.75	60	.75	.65	.75	....	.76	.65	.70	.80
(19) Hair	per bu.	.75	.60	1.00	.75	.60	.75	.35	.65	.75	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs ‡	per yd.	.45	.35	.35	.355	.44	.351	.35	.345	.43	.3875
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	....	35*	.34	....	....	2885*	.32*	.32	....	.3450*
(22) Mortar Color, red	per lb.	.05	.03	.045	045*	.045	03	.025	025	.04	.0495
(23) Mortar Color, buff	per lb.	.05	.035	.045	.045*	.045	35	.0325	.035	.045	.05
(24) Mortar Color, double strength black	per lb.	.06	.055	.065	.12	.055	.04	.035	.04	.085	.10
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	105.00	95.00	....	140.00	....	125.00	91.00	....	....
(26) Partition Tile, Clay (4x12x12 in.)	per M.	120.00	110.00	105.00	....	150.00	108.00	140.00	97.00	....	....
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	*	.15	.1575	....	.14	.1025	....	.15	.145	.125
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	*	.17	.1725	.. .	.17	.1275	....	.185	.165	.15
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	2.80	2.70	2.70	3.00	3.26	3.00	3.20	3.05	3.40	3.80
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(31) Paving Block, Vitrified (3½x4x8½ in.)	per M.	....	....	....	45.00	35.50	....	....	....	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	3.50	35.00	37.00	58.00	35.50	36.00	36.50	55.00	35.00	37.25
(33) Sand (Building)	per ton	2.40	2.00	....	....	2.75	2.30	....	2.50	1.60	1.60
(34) Sand (Building)	per yd.	....	2.30	....	1.50	1.00*	3.10	....	3.37	2.16	1.60
(35) Sewer Pipe, single strength, on list	per cent	47%*	50%*	....	....	....	....	....	35%	....	....
(36) Wall Coping, 9 in	per ft.	.22	.25	.30	.25	.43	.29	.1875	.18	.35	....
(37) Wall Coping, 13 in	per ft.	.33	.35	.40	.34	.59	.39	.255	.27	.45	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	20.00	....	....	....	20 80	17.00	....	22.00	17.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks	per ton	22.00‡	21.00*	16.00*	22.00*	20.00*	20.50*	20.00*	24.00*	20.00	20.00
(40) Wall Plaster, sanded, in cloth, 100 lb., inc. sks	per ton	22.00‡	14.50*	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloh, 100 lb., inc. sks	per ton	22.00‡	21.00*	16.50*	....	22.80*	21.00*	....	21.00*	20.50*	....
(42) Wall Ties, galvanized	per M.	5.25	4.00	3.50	7 00	4 25	3.00	3.50	3.25	4.00	6.00
(43) Wall Plugs	per M.	.	....	....	16.50	31.00	20.00	....	16.50	20.00	30.00
(44) Asphalt Shingle (*singles, †stripped)	per sq.	6.60*	....	6.50	8.00*	7.50†	8.00†	....	7.50	7.75**	10.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	2.75**	....	3.25	3.50*	3.25*	...	....	....	....	4.00*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.85§*	....	2.75†	2.85§	2.25§*	....	....	3.50§*	4.00§*	3.50*
(47) Stucco Board, Medium wt	per M. sq. ft.	....	55.00	60.00*	65.00	55.00	....	....	....	....	...
(48) Stucco Board, Narrow Key	per M. sq. ft.	...	60.00	60.00*	70.00	55.00	...	....	....	....	60.00
LUMBER ITEMS				*							
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	12.00	10.00	10.50*	9.00	9.00*	10.00	8.00	7.50	....	9.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	40.00	45.00	45.00*	40.00	44 00	40.00*	40.50	40.00	....	34.00*
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	50.00	101.00	53.00	60.00	40.00	47.50	45.00	....	52.50
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	38.00	40.00	80.00	40.00	40 00	....	37.00	38.00	....	....
(53) 1x4 No. 2 Sheathing	yer M. Board ft.	....	35 00	73.00*	38.00	40 00	35.00	33.50	30.00	....	41.00
(54) 1x4 "B" Flooring	per M. Board ft.	....	70.00	90.00*	89.00	65 00	90.00*	60.00	52.50	....	75.00
(55) Yellow Pine Clear Finish	per M. Board ft.	80.00	90 00	105.00	88.00	90.00	100.00	75.00	75.00	....	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	70 00	72.00*	65.00	70.00	65.00*	55.00	55.00	....	47.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	60.00	93.00	58.00	60 00	....	52.50	48.00	....	....
(58) Cypress Finish Lumber	per M. Board ft.	125.00	130.00	....	165.00	140.00	125.00*	120.00	125 00*	....	....
(59) ⅜x4 "B" Partition	per M. Board ft.	65.00	70.00	69.00	80.00	70 00	60.00*	60.00	58.00	....	45.50
(60) ½x4 "B" Ceiling	per M. Board ft.	50.00	65.00	....	60.00*	55.00	50.00	50.00	48.00	....	37.50
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	55.00	65.00	65.00	56.00	60.00	60.00	55.00	44.00	....	62.50
(62) Mouldings, Yellow Pine	over list	40%	1 00	50.90	*	25%	25%	25%	....	....	15%
(63) Washington 16 in., 5/2 Clears	per M.	6.00	6.00	6.65	6.50	6.75	6.00	6.00	5.75	....	4.75
(64) Washington 16 in., 5/2 Clears	per sq.	....	5.75	7.25	5.75	....	....	....	....	....	6.00
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	6.00	7 50	....	....	....	....	6.00
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	5.25	....	....	....	....	....	6.00
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	42.00	50.00	92.00*	56.00	60.00	40.00	56.00*	45.00	....	42.00*

*(Above item 49)—No lumber revisions received for this issue from this city.

††Lincoln, all prices less 5 per cent cash 10th of month.

Lime (Item No. 1, bulk)—Per 80 lb. bu., Denver, Sioux City, hydraulic; Minneapolis and St. Paul, per 180 lbs. (Barreled, Items 2, 3) Minneapolis and St. Paul, headed; Denver, 200 and 400 lbs.

Crushed Stone (4, 5)—Lincoln, 1 in. and chips; Milwaukee, net.

Common Brick (Item 6)—St. Louis, hard common. Milwaukee, another quotes $14.50.

Flue Lining (10, 11)—Sioux City, f. o. b. yard.

Fire Brick (12)—Sioux City, f. o. b. yard; Green Bay, high grade.

Fire Clay (13)—Sacks not included, Des Moines, Sioux City; 5c, Green Bay.

Gravel (14)—Des Moines, 3000 lb. yard; Milwaukee, St. Louis, Green Bay, per ton.

Metal Lath (Item 21)—Milwaukee, Gauge No. 27; Denver, Kansas City, Gauge No. 26; Sioux City, Gauge 27, 2.3 lbs.

Mortar Color (22, 23, 24)—Davenport, discount in quantities.

Partition Tile, Gypsum (Item 27, 28)—Green Bay, prices quoted at time of delivery.

Sand (34)—Des Moines, 3000 lb. yd.

Sewer Pipe (35) — Milwaukee 3x12 in.; Green Bay, 3 in. to 24 in. inc.

Wall Plaster (39, 40, 41)—Returned sacks 15c, Milwaukee, St. Paul, Davenport, Des Moines, Sioux City, St. Louis, Lincoln; sacks, 15c, Kansas City.

Asphalt Shingle (Item 44)—Lincoln, Standard wt.

Roofing, Slate Surf. (Item 45)—85 lbs., Green Bay.

Roofing, Smooth Surf. (Item 46)—60 lbs., Green Bay; 55 lbs., Des Moines, St. Louis, Lincoln.

Stucco Board (Items 48, 49)—Minneapolis and St. Paul, $55.00 to $60.00.

(Item 49)—Minneapolis and St. Paul, No. 2, mixed. Des Moines, fir. **(Item 50)**—Minneapolis and St. Paul, Pine; Sioux City, Fir; Denver, No. 1 Com. Fir; **(Item 53)** Minneapolis and St. Paul, Fir. D. and M.; **(Item 54)**—Sioux City, E. G., Minneapolis and St. Paul, Fir; **(Item 56)**—Sioux City, D. Western Pine, Minneapolis and St. Paul, 2nd cl. Fir; **(Item 58)**—Sioux City, D. Western Pine; St. Louis, $125 to $170; **(Item 59)**—Sioux City, Fir; **(Item 60)**—Davenport, ⅝x4 in.; **(Item 62)**—Davenport, list; **(Item 67)**—Denver, White Pine, Minneapolis and St. Paul, 8 in., $96 00; 10-in., $101.00; 12-in., $106.00; Kansas City, 6 in. to 10 in., $46.00, 12 in., $56.00.

delivered-on-the-job, unless otherwise noted. An asterisk (*) after a figure, refers to note below. A star (★) after city name, denotes no revisions received.	Butte, Mont.	Cheyenn Wyo.	Los Ang Calif.	San Dieg	San Fran	Portland, Ore.	Seattle, Wash.	Winnipe Man.	Toronto, Ont.	Halifax, N. S.	Quebec
(1) Bulk Lime....per cwt.	.90	....	$1.10	$1.60	....	*	....	$0.60*	$0.825	$0.75	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	....	$3.50	3.00	2.70*	3.25	$3.50	$3.25	3.60	....	3.45*	3.00
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	....	....	....	....	....	....	....	....	5.75*	....
(4) Crushed Stone....per ton	....	....	....	2.12	....	....	....	....	2.445*	.15*	3.45
(5) Crushed Stone....per yd.	....	2.00*	....	....	....	....	....	4.35	2.1875*	3.30	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)..per M.	21.00	18.00	....	20.00*	18.50	19.00	19.00	19.00	18.00	22.00	18.00
(7) Corner Bead, galvanized....per ft.	....	.05	.07	.06	0385	.055	.06	.04	....	.055	.05
(8) Drain Tile, 4 in....per ft.	....	....	....	.105	.05	.085	.072	.13	.08	....	.065
(9) Drain Tile, 6 in....per ft.	....	....	.0975*	.14	.065	.09	.12*	.15	.11	....	.115
(10) Flue Lining, 8½ in. x 8½ in....per ft.	....	....	.3375	.50	.38	.45	.40	.55	.441	.35	....
(11) Flue Lining, 8½ in. x 13 in....per ft.	....	....	.4875	.72	.55	.65	.60	.75	.63	.55	....
(12) Fire Brick, Standard 9 in. No. 1 clay....per M.	80.00	80.00	47.50	80.00	70.00	85.00	70.00	90.00	95.00	90.00	88.00
(13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	20.00	25.00	12.50	35.00*	20.00	22.00	24.00	40.00	22.00	22.00*	22.50
(14) Gravel, washed....per yd.	3.00	....	....	2.78	1.25	1.35*	....	3.50	1.35	3.75*	1.75
(15) Hollow Building Tile (8x12x12 in.)....per M.	15.00*	....	....	235.00	....	190.00	....	280.00	....	....	....
(16) Hollow Building Tile (8x5x12 in)....per M.	15.00*	....	100.00*	120.00	112.00	100.00	110.00	181.00*	....	....	....
(17) Hydrated Lime (masons) in 50 lb paper bags....per bag	1.25	.70*	1.00*	.85	1.10*	.75*	....	.63	.5563	.75	.72
(18) Hydrated Lime (finishing) in 50 lb. paper bags....per bag	....	....	.75	.90	....	.75*	24 00	.63	.5813	.80	....
(19) Hair....per bu.	.75	....	.60	.60*	....	....	....	1.00	....	....	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs ‡....per yd.	....	.45	.40	.44	.35	.45	.42	.36	....	.45	.46*
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs....per yd.	....	.42	....	....	.33	.36*	....	....	....	....	....
(22) Mortar Color, red....per lb.	.06	.07	.07	.05	.075	.12*	.08	.09	.0275	.10	.10
(23) Mortar Color, buff....per lb.	.07	.08	.07	.05	.075	.09*	.12	.09	....	.10	.10
(24) Mortar Color, double strength black....per lb.	.07	....	.07	.05	.10	.14*	....	.09	....	....	....
(25) Partition Tile, Clay (3x12x12 in.)....per. M.	15.00*	....	85.00*	120.00	....	....	110.00	181.00	70.00	....	....
(26) Partition Tile, Clay (4x12x12 in.)....per. M	....	....	103.00*	140.00	....	....	120.00	203.00	85.00	.20*	....
(27) Partition Tile, Gypsum (3x12x30 in.)....per ft.	....	....	....	....	....	....	....	.155	....	....	....
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	....	....	....	....	....	....	.165	....	....	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)..per bbl.	3.70	4.60	3.41*	4.12	3.60	3.55	3.65	4.40	4.55	5.40	4.28
(30) Extra charge for each cloth sk....per sk.	.10	.10	.15	.12	.15	.15	.05	.20	.20	....	.20
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	....	....	....	55.00	....	65.00	48.00	....	....	....	....
(32) Plaster Board ⅜ in. thick....per M. sq. ft.	....	40.00*	....	50.00	....	38 00	.35*	56.50	38.75	37.50	46.00
(33) Sand (building)....per ton	....	....	....	1.63	....	45.00	....	....	1.40*	2.50	2.15
(34) Sand (building)....per yd.	2.50	3.00	....	....	....	1.35	....	3.50	3.50	3.75	....
(35) Sewer Pipe, single strength, off list....per cent.	....	....	....	*	....	....	....	.35*	37%	....	20%
(36) Wall Coping, 9 in....per ft.	....	....	....	....	....	....	.20	.35	.3780	....	....
(37) Wall Coping, 13 in....per ft.	....	....	....	....	....	....	.28	.45	.5670	....	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags....per ton	....	22.00	....	....	....	....	....	25.50	18.50	....	29.25
(39) Wall Plaster, neat, in cloth, 100 lb. incl. sks....per ton	21.30	....	24.00*	26.00*	23.50*	22.50	24.00*	28.00*	22.50	....	....
(40) Wall Plaster, sanded, in cloth, 100 lb. incl. sks....per ton	....	....	....	....	....	....	....	....	14.00	....	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. incl. sks....per ton	21.30	....	....	....	....	....	26.00*	28.00*	12.50*	3.15*‡	....
(42) Wall Ties, galvanized....per M.	....	....	11.50	7.00	6.30	6.50	....	5.00*	....	7.00	4.00
(43) Wall Plugs....per M.	....	....	....	26.00	26.00	30.00	22.50	23.00	....	20.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	....	....	....	....	....	....	....	10.50	7.80*	....	8.75
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	....	....	3.50*‡	3.25†*	4.50*‡	3.25*	4.50**	5.10†*	3.50*	....	4.35†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	....	4.00§	3.75§*	3.75§*	3.50§*	3.60§*	3.20§*	4.00§*	3.95§*	5.15§*	3.75§*
(47) Stucco Board, Medium wt....per M. sq. ft.	....	....	....	....	48.00*	....	45.00	65.00	....	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	....	....	....	....	....	....	....	....	....	....
LUMBER ITEMS				†		†		†			
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	9.00	12.00	12.50	13.00	10.00	5.50*	5.50	11.00	....	8.00	9.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	....	40.00*	....	40.00	....	20.00*	21.00*	45.00*	....	....	60.00*
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	55.00*	....	48.00	....	22.00	21.00*	48.00*	....	....	60.00*
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	46.00	....	12.00*	17.00*	42.00*	....	....	55.00*
(53) 1x4 No. 2 Sheathing....per M. Board ft.	....	45.00*	....	41.00	....	....	15.50	....	....	....	55.00*
(54) 1x4 "B" Flooring....per M. Board ft.	....	80.00*	....	78.00	....	35.00*	33.00*	84.00*	....	....	50.00*
(55) Yellow Pine Clear Finish....per M. Board ft.	....	100.00	....	96.00	....	55.00*	65.00*	....	....	....	100.00*
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	60.00	....	65.00	....	35.00*	34.00	....	....	....	....
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	....	....	....	....	....	....	....	80.00	....	....	....
(58) Cypress Finish Lumber....per M. Board ft.	....	....	....	....	....	....	....	....	....	....	....
(59) ¾x4 "B" Partition....per M. Board ft.	95.00*	....	....	71.00	....	35.00*	36.00	56.00*	....	....	....
(60) ½x4 "B" Ceiling....per M. Board ft.	....	50.00	....	67.00	....	....	30.00	69.00*	....	....	45.00*
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	....	75.00	....	54.00	....	....	52.00*	....	....	....	....
(62) Mouldings, Yellow Pine....over list	....	50%	....	....	....	....	*	....	....	....	....
(63) Washington 16 in., 5/2 Clears....per M..	5.00	5.50	....	6.40*	....	3.50	3.75	....	....	....	....
(64) Washington 16 in., 5/2 Clears....per sq.	....	....	....	....	....	....	....	7.50	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in. No..1 Com. Yellow Pine Boards per M.	....	....	....	43.00	....	25.00*	21.00*	....	....	....	50.00*

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) means no cloth bags used.

(†) above San Diego lbr. prices means all items are Oregon Pine.

(†) above Winnipeg lbr. prices means 15 per cent off.

Lime (Item No. 1, bulk)—Per 70 lb. bu., Winnipeg; Portland, price on dock. **(Barreled, Items 2, 3)**, per 200 lb. bbl., San Diego, Halifax, 200 and 400 lbs. **Hydrated** (Items 17, 18)—Ton rate, Portland; Portland, 15c credit for returned sacks (20, 21) (also 10c). Los Angeles, Tiger Brand, fine; San Francisco, per 80 lbs.; Cheyenne, 40 lb. paper bags

Common Brick (Item 6)—Car lot rate, San Diego.

Drain Tile (Item 8, 9)—Seattle, clay; Los Angeles, f.o.b. factory, cartage extra.

Fire Clay (Item 13)—San Diego, returned sacks, 8c; 15c, Halifax.

Gravel (Item 14)—Portland, price on dock; Halifax, cu. yd.

Hollow Building Tile (Item 15, 16)—Los Angeles, 5½x8x11½ (Heath); Butte, per ton at yard; Winnipeg, another quotes $155.00.

Hair (19)—Rope fibre used in San Diego, per pkg.

Metal Lath (Item 21)—Portland, Gauge No. 27. Quebec, galvanized.

Mortar Color (Items 22, 23, 24) —Portland iron oxide

Plaster Board (Item 32)—Cheyenne, sheetrock; Seattle, per yd.

Sand (Item 33)—Toronto, car lots on track.

Sewer Pipe (Item 35)—San Diego, sells at list; Winnipeg, price for 4 in.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c, San Francisco, Winnipeg, sacks, 20c, Halifax; sacks, 12c, Los Angeles, San Diego; (Item 48), per bbls., Toronto, Seattle, including sks., 10c each.

Wall Ties (Item 42)—Winnipeg, corrugated.

Roofing Slate Surf. (Item 45)—

80 lbs., Halifax; Portland, best grade.

Stucco Board (Item 47)—San Francisco, button lath, ⅜ in. thick.

(Item 49)—Portland, fir; Quebec, spruce; **(Items 50, 51, 52)**—Quebec, spruce; Cheyenne (50) fir; (51) white pine; Winnipeg, Seattle, fir; (52) Portland, No. 3 Shiplap; **(Item 53)**—Quebec, spruce; Cheyenne, White Pine. **(Item 54)**—Winnipeg, Eg. fir, less 20 per cent.; Portland, fir; Seattle, S. G. Fir; Quebec, spruce; Cheyenne $60.00 & $80.00 fir. **(Item 55)**—Seattle, Portland, fir; Quebec, spruce.

Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

ASBESTOS PRODUCTS

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
Ambler Asbestos Shingles. Catalog. 5½ x 8½ in. 40 pp. Illustrated.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 36 pp. Illustrated. Standard Purlin Spacing Tables.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.
Engineers' Data Sheets. Catalog. 8½ x 11 in. 40 pp. Illustrated. Specifications and working sheets for Ambler Asbestos Corrugated Roofing and Siding.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Johns-Manville Asbestos Wood. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data. List of uses for asbestos wood.

BALANCES, SASH

Caldwell Mfg. Company, The, Rochester, N. Y.
Suggestion for the present-day Architect. Booklet. 6 x 9 in. 16 pp. Illustrated. Gives full-size dimensions and information for the purpose of writing specifications for Caldwell Sash Balances.

BOILERS—See Heating Equipment

BRICK

American Face Brick Association, 1151 Westminster Bldg., Chicago, Ill.
The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.
The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect. Price 50c.
A Manual of Face-Brick Construction. Booklet. 8½ x 11 in. Textbook on construction of the brick wall and various uses of face brick. 31 colored plates of brick houses with plans. Price, $1.00.

Common Brick Manufacturers Association of America, 1309 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available. Price $1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 48 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

BUILDING STONE—See Stone, Building

CEMENT

Alpha Portland Cement Company, Easton, Pa.
Alpha Cement—How to Use It. Handbook 6 x 9 in. 96 pp. Illustrated. A practical handbook on popular forms of concrete construction, including form work, proper proportions in mixing, waterproofing, colored concrete, etc.
Alpha Service Sheets & Bulletins. Special suggestions on the construction of Industrial Housing, Garages, Inclosure Walls, Steps, Sidewalks, Barns, Silos, Farm Buildings, etc.
Alpha Aids. A bi-monthly magazine for those who buy, sell or use Portland Cement, sent complimentary to approved names.

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

Bostwick Steel Lath Co., The, Niles, Ohio.
After The Fire. Booklet. 6 x 9 in. 13 pp. Illustrated. Showing the fire-resistance of Bostwick "Truss-Loop."

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.
Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

DAMPPROOFING

Truscon Laboratories, The, Caniff Avenue and Grand Trunk R. R. Detroit, Mich.
Truscon Plaster Bond—Foundation Coat—Stone Backing. Booklet. 5 x 8 in. 16 pp. Illustrated.
A pamphlet on Dampproofing interior walls and exterior walls under earth filling.

DECORATIVE FABRICS

M. H. Rogers, Inc., 912 Broadway, New York, N. Y.
Samples of the following materials will be sent to architects upon request, to meet specific requirements:
Tapestries, velours, damasks, armures, cretonnes, tapestry panels, needlepoints, chair and sofa seats and backs.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.
Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.
Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

Truscon Steel Company, Youngstown, Ohio
Truscon Steel Windows. Catalog. 8½ x 11 in. 80 pp. Illustrated. Describing steel windows for industrial and commercial buildings.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¾ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Frink, I. P., Inc., 24th Street and 10th Avenue, New York, N. Y.
Catalog 415. 3½ x 11 in. 46 pp. Photographs and scaled cross sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

Kohler Co., Kohler, Wis.
Kohler Automatic Power and Light 110 Volt D. C. Booklet. 5 x 7 in. 32 pp. Illustrated. Describes a standard voltage automatic, electric power and light plant for isolated homes.

Adam Electric Company, Frank, 3650 Windsor Pl., St. Louis, Mo.
The Answer to the Tenant Meter Problem. Booklet 6 x 9 in. 8 pp. Illustrated. Describing the Frank Adam Meter Control Panel Boards and Cabinets which are designed especially for the increase or the decrease of the tenants' requirements in the building.
The Floor-Box With the Reversible Cover. Circular 3¼ x 6¼ in. 8 pp. Illustrated.
Frank Adam Hanger Outlets. Circular 3½ x 6¼ in. Illustrated.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.
Simplex Manual Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Smyser-Royer Co., 1609 Sansom St., Philadelphia, Pa.
Exterior Lighting Fixtures. Catalog F. 8½ x 11½ in. Illustrated. Illustrates lamp standards, brackets, lanterns and pier lights, for exterior use.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.
Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.
Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.
Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.
Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 130 West 34th St., New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs and brief descriptions.

Anchor Post Iron Works, 165 Broadway, New York, N. Y.
Catalog 51. 8½ x 11 in. 53 pp. Illustrated. Anchor Post Fences for Country Place, Factory or Farm.
Catalog 54. 8½ x 11 in. 24 pp. Illustrated. Factory Fences.

FIRE DOORS—See Doors, Windows and Trim, Metal

FIREPLACE EQUIPMENT

Covert Co., H. W., 137 E. 46th Street, New York, N. Y.
Hints on Fireplace Construction. Catalog. 5¾ x 8½ in. 11 pp. Illustrated.
Diagrams of construction and installation of Covert "Improved" and "Old Style" Dampers and Smoke Chambers.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 90*

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
Armstrong's Cork Tile. Booklet. 5 x 7 in. 16 pp. Illustrated in color.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
Speaking of Floors. Booklet. 11¼ x 15 in. 16 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1921. Catalog. 3½ x 6 in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book Three books. 3½ x 5¾ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.

Carter Bloxonend Flooring Co., 1303 R. A. Long Bldg., Kansas City, Mo.
Blox-on-end Flooring. Catalog. 3¼ x 6¼ in. 20 pp. Illustrated. Describing Blox-on-end Flooring and its adaptability to concrete, wood or steel construction; also various methods of installation.
Specification Sheet. 8½ x 11 in. 4 pp. Illustrated. Standard specifications in convenient form for architects and engineers as recommended by the American Institute of Architects.

Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.
Modern Oak Floors. Booklet. 6¼ x 9¼ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
Oak Flooring, How and When to Use it. Booklet. 3½ x 6¼ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thickness and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

General Chemical Company, The, 25 Broad Street, New York, N. Y.
Hard-N-Tyte for concrete and mortars. Booklet. 3½ x 8½ in. 8 pp. Illustrated. Describes use of Hard-N-Tyte as application for hardening concrete floors.

Sonneborn Sons, Inc., L., 266 Pearl Street, New York.
Concrete and Lapidolith. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolize? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Agatex and Its Performances. Booklet. 8½ x 11 in. Describes the methods of hardening concrete floors by the application of a chemical which forms a new surface as hard as agate.

FURNACES—See Heating Equipment

FURNITURE

Estey Organ Company, Brattleboro, Vt.
Pipe Organs. Complete specifications and full information furnished to the architect for pipe organ to be installed in any given residence, upon receipt of plans and other particulars.

GLASS CONSTRUCTION

King Construction Company, N. Tonawanda, N. Y.
Catalog No. 52. 9 x 11 in. 45 pp. Illustrated. Illustrating and describing greenhouses erected for private estates and public parks.

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3⅞ x 8½ in. 32 pp. Illustrated Covers the complete line.

GRANITE—See Stone, Building

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
Ball Bearing Butts. Booklet. B8. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 12F 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American Radiator Co., 816 South Michigan Avenue, Chicago, Ill.
Engineers' Data Book. 8 x 10¾ in. 48 pp. Illustrated. Valuable engineering data for estimating heating and ventilating requirements.
Ventilation for Vento Heaters. Catalog. 8 x 10¾ in. 24 pp. Illustrated. Examples of installation.

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam. Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Hess Warming & Ventilating Co., 1205D Tacoma Bldg., Chicago, Ill.
Modern Furnace Heating. Catalog. 6 x 9 in. 48 pp. Illustrated. Complete information on hot-air furnace heating useful to the architect and contractor regardless of what make of furnace he uses.

Kelsey Heating Company, James St., Syracuse, N. Y.
Booklet No. 5. 4 x 9 in. 32 pp. Illustrated. A dealers' booklet showing the Kelsey Warm Air Generator Method of warming and distributing air. Gives dimensions, heating capacities, weights, kind of coal recommended, and shows the mechanical and gravity system of heating homes, churches and schools.
Monroe Pipeless Booklet. 4½ x 8 in. 20 pp. Illustrated.
Monroe Tubular Heater. Booklet. 4½ x 8 in. 20 pp. Illustrated. General Booklet giving capacities, dimensions, weights, etc.
Syracuse Pipeless Booklet. 4½ x 8 in. 12 pp. Illustrated. General Booklet, giving sizes and capacities.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.
Catalog No. 74. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel heating boilers with specifications.
Catalog No. 75. 8½ x 11 in. 6 pp. Illustrated. Specifications on Tabasco Water Heaters, Kewanee water heating garbage burners and Kewanee steel tanks.

Minneapolis Heat Regulator Company, Minneapolis, Minn.
The Heart of the Heating Plant. Catalog. 6 x 9 in. 20 pp. Illustrated. Describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used.

Page Boiler Company, The Wm. H., 141 West 36th Street, New York, N. Y.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions with specifications of the Volunteer Round and Monarch Square Sectional Boilers; also the Monarch Up-Draft and Down-Draft Smokeless Boiler; with method for apportioning size of boiler and radiation, and other heating data.

Smith Co., H. B., 57 Main Street, Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¾ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
Capitol Smokeless Type Boilers. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describing a new type of low-pressure heating boiler which burns soft coal without smoke.

Warren Webster & Co., Camden, N. J.
Webster Vacuum System of Steam Heating. Catalog. 8 x 10½ in. 36 pp. Illustrated. Describing the Webster Vacuum System of Steam Heating, its principles of operation, and advantages of installation.
Webster Feed-Water Heaters. Catalog. 8 x 10½ in. 28 pp. Illustrated. Describing the construction and operation of the Webster Feed-Water Heaters for steam-heating systems, power plants and industrial plants of every type.

HEAT REGULATORS—See Heating Equipment

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

INSULATION

Bishopric Mfg. Company, 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Business Noise, Its Cost and Prevention. Booklet. 6 x 9¼ in. 16 pp. Illustrated. Data on correction of acoustics in offices, theaters, churches, etc.

Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

JOISTS AND STUDS, PRESSED STEEL

Truscon Steel Company, Youngstown, Ohio
Truscon Structural Pressed Steel. Catalog. 8½ x 11 in. 24 pp. Illustrated. Information on Pressed Steel Beams and Joists for light occupancy buildings. Tables, specifications and views of installations.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 91*

LATH, METAL AND REINFORCING

The Bostwick Steel Lath Co., Niles, Ohio.
Bostwick Steel Lath, Revised Edition 1920. Catalog. 9 x 11½ in. 28 pp. Illustrated. Covers the entire line. Drawings and Specifications.

Corrugated Bar Company, Inc., Buffalo, N. Y.
Corr-Mesh. Catalog. 6 x 9 in. Illustrated. Describes the characteristics of Corr-Mesh, a ribbed expanded metal used in concrete and stucco construction.
Corr-Plate. Catalog. 6 x 9 in. 63 pp. Illustrated. Describes a type of girderless floor construction in which the reinforcing bars are laid in two directions only.

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

Truscon Steel Co., Youngstown, Ohio.
Hy-Rib and Metal Lath. 18th ed. Catalog. 8½ x 11 in. 64 pp. Illustrated. Gives properties of laths, specifications, special uses and views of installations.

LUMBER

California Redwood Assn., 206 Marvin Bldg., San Francisco, Calif.
California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated. Describes the use of Redwood Lumber for various places and conditions in the building of the home.

Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.
The Post Everlasting. Booklet. 10½ x 7½ in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.
Poles That Resist Decay. Booklet. 9¼ x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.

Pacific Lumber Company of Illinois, The, 1105 Lumber Exchange Bldg., Chicago.
Engineering Digest. Redwood Information Sheets. 1. General Data Sheet on Redwood, its Production and Uses. 2. Tanks and Vats for Water, Acid and Alkali Solutions and Oil. 3. Pipe for Water, Chemicals and Sewage Conveying. 6. Farm and Dairy Buildings and Equipment, Silos, Tanks, Pipe, Outbuildings, Irrigation Flumes, Drainage Boxes, Greenhouses, Etc. 9. Railroad Construction and Equipment. 10. Industrial Building Materials. 11. Residential Building Materials.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Brass Company, Waterbury, Conn.
Illustrated pamphlet describes the use and adaptability of extruded architectural shapes to meet the architect's design.

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.

Rome Brass & Copper Company, Rome, N. Y.
Descriptive Price List. 5 x 7 in. A leather-covered loose-leaf book listing sheets, tubes, rods, rolls, anodes, strips, extruded shapes, angles and channels, tapered tubes and hose pipes; molding, door-rail; commutator bars and segments; electrical copper bar, rivets and burs.

METAL TRIM—See Doors, Windows and Trim, Metal

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6⅜ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

OFFICE SUPPLIES

Dixon Crucible Co., Joseph, Pencil Dept., 224 J. Jersey City, N. J.
Finding Your Pencil. Booklet. 6¼ x 3¼ in. 16 pp. Illustrated.
The First Five. Booklet. 3½ x 5¼ in. 10 pp. Illustrated.
A Study in Sepia. Booklet. 7 x 4½ in. 5 pp. Illustrated.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Berry Brothers, Detroit, Michigan.
"Natural Woods and How to Finish Them." Booklet. 6½ x 4¾ in. 95 pp. Containing technical information and advice concerning wood finishing.
"Beautiful Homes." Booklet. 8½ x 6½ in. 26 pp. Illustrated in colors. Giving information to home builders and others on interior finishing.

PAINTS, STAINS, VARNISHES and WOOD FINISHES — Continued

Bird & Company, J. A. & W., 88 Pearl St., Boston, Mass.
Ripolin Specifications. Booklet. 8 x 10½ in. 12 pp. Description. Contains twenty-one carefully prepared specifications for undercoats for different types of work.

Boston Varnish Co., Everett Station, Boston, Mass.
The Inviting Home. Booklet. 5½ x 9 in. 16 pp. Color Plates. A briefly worded book on painting for the busy architect or decorator.
The White Enamel Specification Book. 6 x 9 in. 12 pp. Explaining the use of Kyanize White Enamel on interior or exterior surfaces.

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

Fox Co., M. Ewing, New York, N. Y.
Calcimines. Booklet. 3¼ x 6¼ in. 8 pp. Color cards.

S. C. Johnson & Son, Racine, Wis.
The Proper Treatment for Floors, Woodwork & Furniture. Booklet. 6¼ x 8⅜ in. 32 pp. Illustrated in color. A treatise on finishing hard and soft wood in stained and enameled effects; also natural wood effects.
Portfolio of Wood Panels. 5½ x 10¾ in. 14 pp. A portfolio containing actual panels of finished woods. Also contains valuable information on finishing and re-finishing floors and woodwork.

O'Brien Varnish Co., 1121 Washington Avenue, South Bend, Ind.
That Magic Thing Called Color. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.
Architects' Specification Manual. 8½ x 11 in. 50 pp. Complete specifications for all paint products.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Preservative Coatings. Booklet. 6 x 9 in. 15 pp. Illustrated. Presents in a concise manner the properties and uses of the Standard Paint Company's various paint preparations.

The Sherwin-Williams Co., 882 Canal Road, Cleveland, Ohio.
A Book of Painting and Varnishing Specifications. 8½ x 11 in. 30 pp. A text book on painting and finishing.
Announcement of Sherwin-Williams Flat-Tone Multi-Color Effects. Booklet. 2½ x 6 in. 10 pp. Illustrated. Development of a new system of wall decoration.
Industrial Efficiency and Egg Shell Mill White. Booklet. 6¾ x 10 in.

Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Spread the Sunshine Inside. Booklet. 5 x 8 in. 24 pp. Describes methods for light saving by the application of light reflecting enamels to interior walls of factories and workrooms.

Wadsworth-Howland Co., Inc., Boston, Mass.
Paints and Varnishes. Catalog. 5¾ x 8½ in. 140 pp. Illustrated. Covers the complete line.

PIPE

American Brass Company, Waterbury, Conn.
Illustrated pamphlet giving tables of weights and price-lists devoted to Brass and Copper Pipe in iron pipe and plumbers' sizes.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.

PLUMBING EQUIPMENT

American Brass Company, Waterbury, Conn.
Benedict Nickel. Illustrated pamphlet descriptive of Benedict Nickel White Metal for high-grade plumbing fixtures.

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.

Hess Warming & Ventilating Co., 1205D Tacoma Bldg., Chicago, Ill.
Hess Sanitary Steel Medicine Cabinets. Booklet. 4 x 6 in. 16 pp. Illustrated.

Kohler Co., Kohler, Wis.
Kohler of Kohler. 5½ x 8 in. 48 pp. Illustrated catalog. Shows complete line of plumbing fixtures.
Kohler Architect Specification Forms. 8½ x 11 in. Loose leaf portfolios intended to cover individual specifications. Separate illustrations and specification sheets provided.

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 92*

PLUMBING EQUIPMENT — Continued

Speakman Company, Wilmington, Del.
Speakman Showers and Fixtures. Catalog. 4½ x 7½ in. 250 pp. Illustrated. Catalog of Modern Showers and Brass Plumbing Fixtures, with drawings showing layouts, measurements, etc.
Toned Up In Ten Minutes. Booklet. 7½ x 10½ in. 16 pp. Illustrated. Modern Showers and Washups for Industrial Plants, showing the sanitary method of washing in running water.

Wolff Manufacturing Company, 255 No. Hoyne Ave., Chicago, Ill.
Plumbing Suggestions. Catalog. 3¼ x 6 in. 50 pp. Illustrated. Illustrating, describing and pricing Wolff Quality Plumbing Fixtures for residential installation.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10⅝ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

ROOFING

American Brass Company, Waterbury, Conn.
Copper Products for Roofing Purposes. Illustrated price-list devoted to copper products, including sheets and rolls, for fabricating into leaders, gutters, flashings, shingles, etc.

Creo-Dipt Company, 1025 Oliver St., North Tonawanda, N. Y.
Architectural Service Sheets. 8½ x 11 in. Illustrated. Working drawings of construction, with standard specifications for design and construction of same.

Philip Carey Co., The, Cincinnati, Ohio.
Architects Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Johns-Manville, Inc., Madison Avenue and 41st Street, New York.
Johns-Manville Colorblende Asbestos Shingles. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. 3½ x 6 in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Instructions for Laying Built-up Roofs. Booklet. 8½ x 11 in. Illustrated.
Roofing Facts Worth Knowing. Booklet. 6 x 9 in. 16 pp. Illustrated.

N. & G. Taylor Company, 300 Chestnut Street, Philadelphia, Pa.
Selling Arguments for Tin Roofing. Booklet. 6¼ x 9¼ in. 80 pp. Illustrated. Describes the various advantages of the use of high grade roofing tin, gives standard specifications, general instructions for the use of roofing tin, illustrates in detail methods of application.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHEATHING

Bishopric Mfg. Company, 103 Este Ave., Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

STANDARD BUILDINGS

Truscon Steel Co., Youngstown, Ohio.
Truscon Standard Buildings, 4th ed. Catalog. 8½ x 11 in. 40 pp. Illustrated. Erection details, cross-section diagrams and adaptations are given.

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Vol. 1. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 4. Indiana Limestone Bank Book. 6 x 9 in. 48 pp. Illustrated. Descriptive of the use of Indiana Limestone for bank buildings, with partial list of buildings in which it has been used.
Vol. 27. Designs for Houses of Indiana Limestone. 8½ x 11 in. 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review.*

National Building Granite Quarries Association, Inc., 31 State St., Boston, Mass.
Booklet. 8½ x 11 in. 16 pp. Illustrated. Contains nineteen color plates of standard American Building Granites; specifications; classification listing colors, textures, and producers; detail sheets illustrating relative value of mouldings, economical design and typical construction; a general description of granite including uses, finishes, tests, etc.

STORE FRONTS

Kawneer Co., The, Niles, Mich
Kawneer Solid Copper Store Fronts. Catalog. "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
A Collection of Successful Designs. Catalog. 9¼ x 6½ in. 64 pp Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

STORE FRONTS — Continued

Zouri Drawn Metals Co., B. J. 10, Chicago Heights, Ill.
Architects' Catalog. 8¾ x 11¾ in. 86 pp. Illustrated. Showing a true copy of the approval of the Underwriters' Laboratories. Showing a proper glazing specification, based on the Underwriters' Report.
Catalog B. J. 8. 6 x 9 in. 68 pp. Illustrated. Key to Getting the People In.

STUCCO, MAGNESITE

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

STUCCO BASES

Bishopric Manufacturing Co., 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco board and Bishopric sheathing board.

TERRA COTTA

Atlantic Terra Cotta Co., 1170 Broadway, New York, N. Y.
Questions Answered. Booklet, 7½ x 5¼ in. 32 pp. Illustrated.

National Terra Cotta Society, 1 Madison Avenue, New York, N. Y.
Standard Construction, Indexed, bound volume. 10½ x 16 in. 90 pp. 70 Illustrations. Standard forms of terra cotta construction with short article.
"The School." 10½ x 13½ in. 34 pp. 92 Illustrations. Types of school buildings with short descriptive articles. Volume I, brochure series.
"The Theatre." 10½ x 13½ in. 36 pp. 102 Illustrations. Types of theatre buildings with short descriptive articles. Volume II, brochure series.
"The Store." 10½ x 13½ in. 34 pp. 60 Illustrations. Types of store buildings with short descriptive articles. Volume III, brochure series.

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

THERMOSTATS—See Heating Equipment

TILE, FLOOR AND WALL

American Clay Products Company, 175 Fifth Ave., New York, N. Y.
Home Walls. Catalog. 6¾ x 8¾ in. 72 pp. Illustrated. Contains illustrations and floor plans of many types of homes built of Interlocking Tile from the small California bungalow to homes of pretentious character.
Factory and Warehouse Construction. Catalog. 6 x 9 in. 32 pp. Illustrated. Illustrates the use of Interlocking Tile in the construction of mills, factories and warehouses.

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

Norton Company, Worcester, Mass.
Alundum Safety Tile. Booklet. 5 x 8 in. 15 pp. Illustrated. Description of material and its installation.
Tests of Alundum Tile. Booklet. 5 x 8 in. 18 pp. Illustrated. Describes its composition and proves its adaptability for its innumerable purposes.

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172. 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.
Fireproof Buildings of Natco Hollow Tile. Booklet 8½ x 11 in. 16 pp Illustrated. Showing the use of Natco Hollow Tile for private residences.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.

Gorton & Lidgerwood Company, 96 Liberty St., New York, N. Y.
Gorton Quarter-Turn Packing-Lock Valves. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Describing a new type of valve for all systems of steam, hot water and vacuum heating.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 93*

VALVES — Continued

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates.
Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ in. 16 pp. Illustrated.

Warren Webster & Co., Camden, N. J.
The Webster Type N Modulation Valves. Catalog. 8 x 10½ in. 8 pp. Illustrated. Describing a quick response, conveniently operated, and simple radiator supply valve.
The Webster Sylphon Trap. Booklet. 8 x 10½ in. 12 pp. Illustrated. Explaining the importance of the properly operating radiator return trap.

VENTILATION

American Ventilating Company, The, Martin Bldg., Pittsburgh, Pa.
Adequate Ventilation. Catalog. 8¼ x 10¾ in. 24 pp. Illustrated. Explaining the fundamentals of proper ventilation. Methods of determining number and size of ventilators.
American-Larson Suction Ventilators. Catalog. 8¼ x 10¾ in. 24 pp. Illustrated. Description contains valuable data on adequate ventilation. All construction details fully illustrated and described. Gives methods of determining number and size of ventilators required for a given job, also charts, giving dimensions and prices.

Globe Ventilator Co., Dept. P., Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.

WALL BOARDS

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.

WATERPROOFING

Minwax Company, Inc., 18 East 41st Street, New York, N. Y.
Waterproofing Exposed Walls. Bulletin No. 22. 8½ x 10 in. 12 pp. Illustrated. Descriptions and specifications dealing with two methods of dampproofing above grade walls, viz., Minwax clear waterproofing or Minwax brick and cement coating, and Minwax asphaltic dampproofing No. 300.
Products Bulletin. 8½ x 5½ in. 24 pp. Illustrated with drawings. Condensed catalog of Minwax products for standardized structural protection.

Ruberoid Co., The, 95 Madison Ave., N. Y.
Impervite. Circular. 8½ x 11 in. 4 pp. Illustrated. An integral waterproofing compound for concrete, stucco, cement, mortar, etc.

Toch Brothers, 320 Fifth Ave., New York, N. Y.
Toxement. Booklet. 5¼ x 8½ in. Illustrated. 24 pp. Describes Toxement, an integral waterproofing compound for concrete, stucco, cement, mortar, etc.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Science and Practice of Integral Waterproofing. Pocket size. 33 pp. Illustrated.
Contains full specifications for waterproofing MASS Concrete, stucco and Cement Plaster Coat. Entire chapter devoted to "Practical Application of Waterproofed Cement Plaster Coat."
Technical Pamphlet #8. Booklet. 4 x 7 in. 28 pp. A discussion of why concrete requires waterproofing and the properties an integral waterproofing must possess to operate effectively with the natural properties of concrete.

WATER SOFTENERS

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WINDOW HARDWARE

Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¼ in. 24 pp. Illustrated. Covers complete line.

L. P. T. Specialty Co., Madison Terminal Bldg., Chicago, Ill.
Details and Specifications for Counter Balanced Window Hardware. 8½ x 11 in. Illustrated with drawings and blue prints.

Smith & Egge Mfg. Co., The, Bridgeport, Conn.
Catalog No. 10. 6¾ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

WINDOWS, CASEMENT

Crittall Casement Window Co., 2703 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.

Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Architects' Portfolio. 8½ x 11 in. Looseleaf. Large scale working details for mill-work and installation.
F. S. Details 20 x 23 in. and 15 x 22 in. Working details for mill-work and installation.
Hoffman Casements Catalog. 7 x 8½ in. 16 pp. Illustrated.

Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

WOOD—**See Lumber**

F. A.

THE ARCHITECTURAL FORUM

AUGUST 1921

Single Copy Sixty Cents ROGERS AND MANSON CO., PUBLISHERS Six Dollars the Year

Our National Appreciation of Tile Values

IN no other part of the world is there a keener appreciation of Tile values or a more intelligent use of those values than in the United States.

Modern methods of production, applied to a traditional regard for burned clay extending back through the centuries, have resulted in beauties of texture, color and design beyond the dreams of those who worked in clay in ancient times.

The great variety of colors developed by American producers of Tiles; the perfection of glazes that has rewarded persistent effort; the craftsmanship that features American methods and the quality that characterizes the American output—

All of these, as achieved by the members of this association, have helped to place this country at the fore in the manufacture of Tiles.

The Associated Tile Manufacturers

Beaver Falls, Pa.

THE ARCHITECTURAL FORUM

VOLUME XXXV NUMBER 2

CONTENTS for AUGUST 1921

PLATE ILLUSTRATIONS

LETTERPRESS

ALBERT J. MacDONALD, Editor

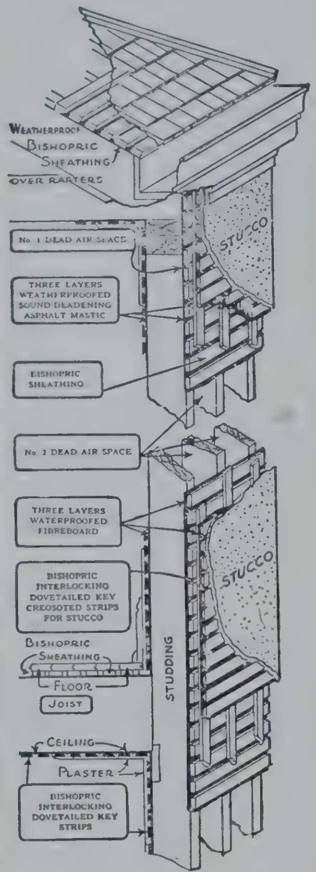
Published Monthly by
ROGERS AND MANSON COMPANY
142 Berkeley Street, Boston 17, Mass.
Advertising Department, 103 Park Avenue, New York
Yearly Subscription, payable in advance, U.S.A., Insular Possessions and Cuba, $6.00
Canada .... $6.75 Foreign Countries in the Postal Union, 7.50
Single Copies .... 60 cents All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.

Albert J. MacDonald, Pres. and Treas., S. Howard Myers, Vice-Pres., Robert Sweet, Sec.

A stucco house built of

BISHOPRIC

is for "All Time and Clime"



Residence of Geo. W. Klewer, Architect, 36 Crescent Drive, Glencoe, Ill. Bishopric Sheathing used as sub-flooring, on roofs under shingles, and as Sheathing under Bishopric Stucco Base. Bishopric Stucco Base used on all exteriors. Bishopric Plaster Base used on all interiors

Glencoe, Ill., November 3, 1920

The Bishopric Manufacturing Co.,
Cincinnati, Ohio.

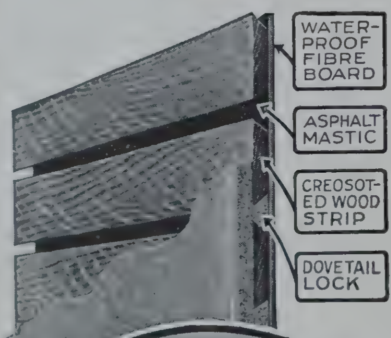
Gentlemen:

In the construction of my own home in Glencoe, Ill., the use of your Bishopric as under-flooring, outside sheathing and as roof boarding was very satisfactory. As under-flooring, particularly in the first floor, it works well as a preventive against basement dust getting into the living rooms above; as sheathing, it insures closed air spaces in the outside walls, and as roof boarding, its economy in cost was a big factor. As I was building in the early spring I was doubtful as to the effect rain might cause, but ten or twelve rain storms seemed to have no effect on its efficiency.

Where possible, I am advocating the use of Bishopric, both as I used it and as a support for plaster.

Yours very truly,

GEORGE W. KLEWER, Architect



IT is of great importance in the construction of the house of stucco to provide for the preservation of its beauty, its resistance against fire, vermin and decay, its insulation against change of temperature and dampness. Bishopric stucco and plaster base in construction and in use offer the possibilities of this insurance.

FOR DETAILS & SPECIFICATIONS SEE FIFTEENTH EDITION SWEETS CATATOG PAGES 353-369 INCLUSIVE

THE DOVETAILED KEY INTERLOCKS THE PLASTER
BISHOPRIC STUCCO AND PLASTER BASE
TRADE MARK REGISTERED

We have prepared a booklet for you, containing facts and figures, and illustrated with photographs of beautiful houses built with Bishopric stucco, plaster and sheathing units. Ask for it.

The Bishopric Manufacturing Company

103 Este Avenue Cincinnati, Ohio

Factories: Cincinnati, Ohio, and Ottawa, Canada

New York Office, 2848 Grand Central Terminal

THE EDITOR'S FORUM

WASTE IN THE BUILDING INDUSTRY

WE find ourselves being gradually reconciled to the fact that we are in the midst of a process of readjustment and reconstruction from an economic viewpoint that is going to tax our energies in ways far different from those resulting from any experience in the last quarter-century.

Coincident with each important war in modern history there has been a period of great inflation, and following it a long era of readjustment and falling prices. One peculiarity of these periods is that wages in actual dollars have not receded as much as prices of commodities. Inasmuch as there is always an economic balance maintained between wage rates and the costs of commodities there is a reason for this apparent discrepancy.

The explanation may be found in the revolutionary changes that took place in industry during these previous periods of reconstruction. The most recent analogous situation is the period following the civil war and it is well known that the very wide introduction of machinery then was sufficient to increase production so that for a higher weekly wage a much larger volume of work was possible than for the previous wage. The workers were able to produce more and there was not the necessity for a decline in wages to correspond with the reductions in commodity prices. This permitted a higher standard of living among laboring people and this standard has steadily risen. Whether present wages are greatly reduced in the coming years will depend upon the productivity of labor. Machinery has seen a marvelous development but it is hardly probable that it can be sufficiently further developed to provide the whole answer. The larger help must come from elimination of waste and from better management.

Considerable thought is being given these problems and the building industry stands out conspicuously as being in need of special study in this regard. There are certain conditions in the building industry which cause large wastes, such as seasonal employment that perhaps cannot be materially changed by the efforts of architects, but in certain other kinds of waste and in management there are many opportunities for the architect to aid.

Mr. D. Knickerbacker Boyd, in an address before the Engineers' Club of Philadelphia, brought out many points of vital importance in the consideration of co-ordination among the elements of the industry that would reduce the amount of seasonal unemployment. He likewise touched upon other details of direct concern to architects. He claims that much waste could be eliminated if architects and engineers were to standardize the parts of certain buildings and the detail drawings for the erection of the buildings. It has been estimated that the architect devotes 25 per cent of his time to the designing of a building and 75 per cent to structural and mechanical requirements. Standardizaton can certainly be applied with promise of saving to this 75 per cent. Likewise, in the matter of contractors' bids and the great waste involved through duplication, the architect can materially serve in working out some method of quantity surveying which will greatly lessen the contractors' overhead costs; otherwise some system of charging for estimating time would seem to be necessary.

The whole subject is worthy of very serious study on the part of the profession, and while the part the individual can play may seem small in comparison with the task, the aggregate effect will count and another step will have been taken toward stabilization.

SMALL GARDEN DESIGN

ANY movement which will encourage the development of garden space about the typical suburban home is to be commended. The Society of Little Gardens has this object as its aim and it now appeals to the architectural profession for assistance in securing garden designs that may be carried out by people of moderate means. The Society has arranged a competition with prizes as described elsewhere in this issue, and the resulting advocated designs are to be made available to people interested in developing their property in a modest way.

BOOK NOTES

A BOOK OF CEILINGS, by George Richardson, F.S.A. Reprint by William Hepburn, Inc., New York. 48 plates, 11½ x 17½ ins. Board covers. $12.50 net.

THE original book, of which this is a recent reprint, was published in London in 1774. It is a collection of plates with brief descriptions, showing line drawings of the patterns which were executed either in modeled plaster or in painting. The prevailing interest today in the styles developed in America and in England during the eighteenth century lends interest and value to this collection of drawings. The original plates were etched by George Richardson who was a designer of the period, and who, we note from his introduction, was identified with the Adam brothers for 18 years.

The designs cover a variety of treatments, all based on varying compositions of geometrical nature; some are for flat ceilings and others for different vaulted types. The reproductions of the plates are in good, clear lines and the size of each ceiling is given to indicate the scale. No idea of the relief of the ornament is given because there are no sections, but in other respects the book provides a valuable reference work on the subject.

CHARLES STREET MEETING HOUSE
BOSTON, MASS.
From Pencil Drawing by Harold R. Shurtleff

The
ARCHITECTURAL
FORUM

VOLUME XXXV AUGUST 1921 NUMBER 2

The Restoration of the Palace of Venice in Rome

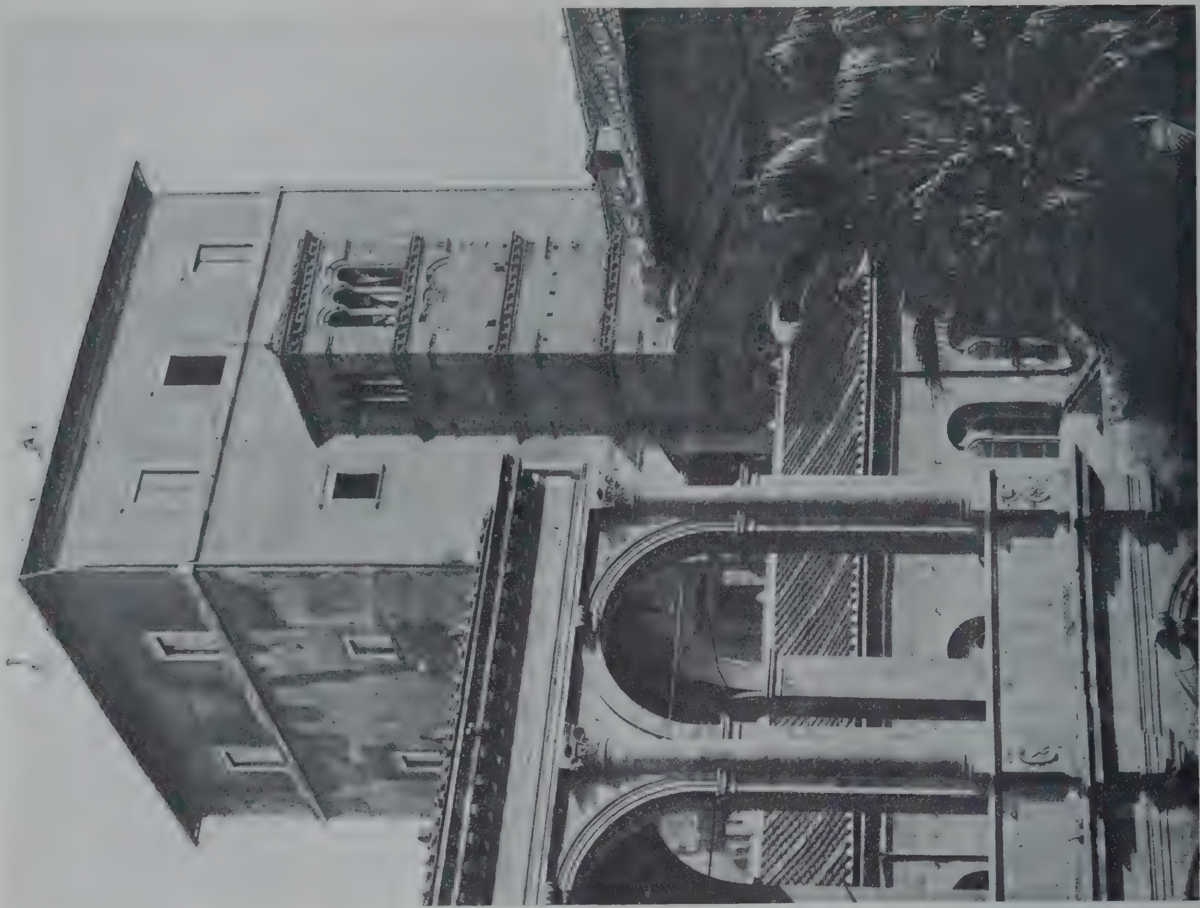
By UMBERTO OLIVIERI

IN August, 1916 the Italian government, yielding to the general pressure of public opinion and in order to secure immediate partial compensation for the serious losses cau ed by the Austrians to national art treasures, such as the destruction of the fresco by Tiepolo on the vault of the Church of the Scalzi, decided to seize the Palace of St. Mark in Rome, commonly known as the Palace of Venice, or the Palazzo di Venezia, which had been since the Peace of Campoformio in 1797 in the possession of the Austro-Hungarian government, as the seat of the Austrian embassy to the Vatican. After having added this magnificent monument to the patrimony of the state, the government devoted it to a collection of works of art, and in order that it might perpetuate the name which suggests its origin and history, called it the Museum of the Palace of Venice. Thus this ancient and dignified building of the popes, which was later the sumptuous seat of the ambassador of the Venetian Republic, afterward of the Austrian representative, and since 1870 the symbol of the irredentistic aspirations of Italian youth, has now become for new Italy the symbol both of her victory and of the spiritual needs of the nation.

In order to understand its importance and how it came to be so coveted, it is necessary to review briefly the history of the edifice. Its dedicatory inscription by the Venetian cardinal, Pietro Barbo, establishes the year 1455 as the date of the construction of the eastern wing of the palace proper. The nucleus of the present palace, however, is the

The Palace of Venice, Rome

DETAIL OF COURTYARD LOGGIA



XII CENTURY BELL TOWER SEEN FROM COURTYARD

THE PALACE OF VENICE, ROME

ancient and glorious Basilica of St. Mark, still an important part of it, dedicated by the Venetians to the two saints, St. Mark the Evangelist, patron saint of the Adriatic, and the Pope St. Mark, and consecrated originally by the latter to the veneration of St. Mark the Evangelist in 366.

In the year 833, by order of Gregory IV, the basilica underwent a radical restoration; nearly at the same time as the construction of the palace, the church was transformed by Cardinal Pietro Barbo into the form which it still retains. To the fact of the pre-existence of the church and its dedication to saints so endeared to the Venetians, we owe it also that Barbo, learned and magnificent cardinal, chose this location for his luxurious abode. The church was by degrees wholly surrounded by the palace, and extends through it from the atrium, which opens onto the little Square of St. Mark, to the sacristy on the street called of the Plebiscito.

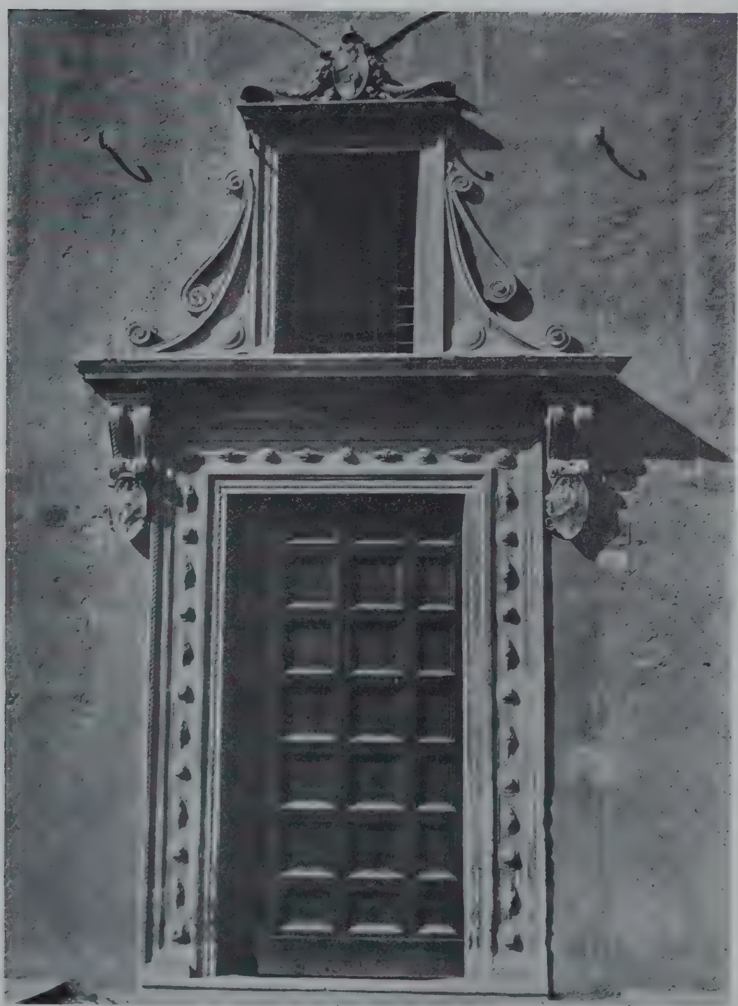
The first fruit of its recovered possession by Italy has been the recent architectural improvement of the church. The fine Loggia della Benedizione (or Benediction), placed just above the atrium or entrance of the church, lost long ago through the bad taste of a Venetian ambassador, has been restored and, as shown in one of these illustrations, the harmony of its three arches of the fifteenth century, which the ambassador walled up, is once more to

Facade of the Church of St. Mark, Part of the Palace of Venice
After the Walls Closing the Arches of the Loggia Had Been Removed

be seen. Today, by the intelligent direction of the Royal Superintendent of the Monuments of Rome, the loggia, as restored to its primitive splendor by the removal of the walls in the arches, is a proof of the artistic aspirations of our epoch, which, if it does not know how to create, at least intends to restore throughout Italy, to their original beauty, all the remains of the past centuries.

The little Gothic window which opens toward the Piazza San Marco, is a relic of the first enlargement made for the house of Cardinal Barbo, who meant to build his residence in the Gothic style throughout. Being a true man of the renaissance, the Venetian, Pietro Barbo, who afterwards became Pope Paul II, had the constant ambition, like that of a Roman emperor, of transmitting his likeness to posterity. Therefore at the head of the original staircase, which has been replaced during this last year by another more spacious and easier, was placed the bust of the pontiff, which has lately been brought back to the palace, after passing a few years in exile at the seat of the Spanish embassy in Rome. The ancient staircase on the side toward the Piazza Venezia has been left as it was. Narrow, not well lighted, severe in its sober architectural decoration, it proves by its original details the very primitive character of the building, still mediæval enough to look like a fortress with its towers and battlements, while the mass, strong and flat, already reveals the characteristics of the renaissance. It can properly be numbered among the lordly Roman palaces of the fifteenth century, with the grace of its magnificent *loggiato*, the enchantment of the *palazzetto* (or "little palace," called also St. Mark's Garden), its Gothic windows, and its spacious rooms, embellished with decorations which express the new born love for the art of Imperial Rome.

Who was the architect of the palace? At least to whom may we give the credit, among the bearers of the great names of Italian art, of even having co-operated in giving to this papal building a form of purest beauty? Vasari, about 1500, attributed the design to Giuliano da Majano, but his opinion is flatly disputed by architects and art lovers, inasmuch as Giuliano was only in Rome after 1465, when the building, which is the Roman equivalent of the Pitti Palace in Florence, was already under way. A biographer of Paul, Gaspare da Verona, extols the cleverness of a certain Francesco of Borgo San Sepolcro, as architect and director of the construction in the first years of this pontificate. Guiseppe Zippel, however, in his work on the Palazzo di Venezia, thinks that Francesco dal Borgo was not the author, but only one of many artists who quietly worked with others on this and other works to prepare the glorious splendor of Italian architecture. Many architects, artists and authors, such as Guiseppe Sacconi, Ettore Bernich, Domenico Gnoli, Guiseppe Zippel and Corrado Ricci, have thought that the conception of both palace and garden is due to Leon Battista Alberti. Zippel says: "The one who ruled undisputed lord in architecture in the Rome of Eugene IV and Nicholas V, was Alberti. In those very years when Pietro Barbo was thinking of the reconstruction of the district of St. Mark, this very learned Florentine composed and published that wonderful book 'De Arte Ædificatoria' (The Art of Construction), which was the first book on architecture written at the time, and formed a code for architects. Can we not believe that the Venetian Cardinal Barbo, cherished by Pope Nicholas, with whom he had in common both love for art and enthusiasm for great building plans, would naturally rely upon the learning and ability of this prince of architects, then in Rome? This is probable, inasmuch as Nicholas V himself derived the inspiration for the superb transformation of St. Peter's, the Vatican, and the Leonine City, from Alberti's doctrine. It is very likely, we



Secondary Entrance to Palace of Venice

think, that to Alberti is due a great part in the promotion and fostering of the building ambitions of Cardinal Barbo, as well as the realization."

Corrado Ricci, surely a great authority, says: "Both the architectural ensemble of the palace, St. Mark's porch, and some detached parts, as well as the conception of the garden, and several motives of decoration, in a word the whole building, regarded either as a mass or in its details, reveals in the one who first planned it, the innovator, the man who had conceived an original idea, after long studies, not only artistic, but also historic and literary; the humanist who had penetrated not only the forms of antiquity but also the spirit." And such a man in that day and place, could be none other than Leon Battista Alberti. That the search for his name in documents of that time might be fruitless, is easily understood; Alberti, and this is more than proved, did not always attend to the execution of the works for which he gave advice or drawings. He himself declared: "It is enough to give the right advice and drawing to whomsoever asks it of you." Alberti, as also Raphael later on, in things relating to architecture, was an artistic adviser of so much authority that to him there went for counsel or plan, popes and princes from all parts of Italy. The Venetian, Pietro Barbo, cardinal and then pope, his nephew, Cardinal Marco Barbo, Cardinal Domenico Grimani and many other prelates and pontiffs of the fifteenth century, especially Innocent VIII, took all possible pains to make splendid the building which gradually surrounded the ancient Church of St. Mark, taking the place of the very squalid houses then existing.

Detail of Ceiling in Church of St. Mark

Those in charge of the Palazzo di Venezia since its acquisition by the Italian government have done much to restore the interior to its original condition. The Sala Regia, which had been partitioned off into six rooms, is now its original size and here were found the original decorations, work of the end of the fifteenth century and attributed to Bramante. A long line of pilasters, decorations with candelabra-like ornament and set between panels of imitation marble, is painted on the walls and upholds a rich entablature of which the frieze contains winged figures of Fame, with trumpets. On the lower part shields are applied whereon are painted portraits of the Cæsars. The complete restoration of the Sala Regia and the Sala del Mappamondo, or Room of the Globe, to their original appearance and the renewal of the remains of the decoration in other of the state apartments are the heavy tasks confronting those in charge of the restorations. The problem deals chiefly with motives purely ornamental, and for that reason very well understood, while the few figures comprised therein are preserved nearly in their integrity. So, while it is planned to restore a genuine work of the fifteenth century and to discard the paintings of later restorations, the work will be executed with reverence for the memory of the famous painters to whom are due the original decorations.

Such a building, closely connected with Italy's art and history, could be properly used only for the purpose which has been determined by the government decree. A great museum of the arts in general, which is not merely a gallery for pictures or a fine collection of statues, has been lacking in Rome up to the present time. A comprehensive, permanent collection of furniture, glass, wood carving, arms, tapestry, ceramics, stuffs, and medals has never been assembled, nor is it possible to assemble it in any of the present Roman galleries. When in 1911 the successful exhibition of retrospective art was held in the Castle of St. Angelo in Rome, many Italians asked why it would not be possible to establish in Rome a permanent collection which would exhibit examples of the arts connected with every phase of human life, placing, for instance, a wrought iron bed or carved table alongside majolica plates, and near the work of some famous painter

of the epoch, who, in common with the humble smith or the poor potter, enjoyed the artistic influences of that day.

In many other countries, especially in Germany and Switzerland, the perfect arrangement of such a museum does not make evident the really small amount of artistic material displayed therein. With the Italians, on the contrary, the extraordinary abundance of masterpieces in museums and private collections has resulted in a special point of view regarding certain arts, so that finally they have been called, unjustly, "minor arts." This has been encouraged by pseudo esthetics of a literary nature and by the survival of fixed ideas of art which arose at the beginning of the nineteenth century, during the neo-classic vogue. For this reason many of the best products, in which the immortal art tradition of the people of different Italian regions is expressed, are unfortunately lost to Italy through commercial dealers, often of little intelligence and less conscience. The exhibition in the Castle of St. Angelo gave to all lovers of art a broader vision of the possibilities of artistic education, but Italy was too soon upset by the war to accomplish anything in this field.

Now the acquisition of the Palazzo di Venezia has given a new impetus to this idea. The largest rooms of the pontifical apartments, renewed as to their fifteenth century decorations, will provide in the Italian capital a marvelous suite for official receptions, especially on the occasion of the visits to Rome of illustrious personages or the heads of states, and also might serve as the anterooms of the greater museum which might arise from the broad organization of which we have spoken. A few undoubtedly genuine pieces of rare beauty, proper proportions and correct dates will complete the furnishing of these great halls, part of the interest and attraction of which lie in their enormous sizes, unusual in modern edifices. Then will follow the sections of the museum proper, where paintings and sculptures of the renaissance will not be stored in cold rooms with iron bars at the windows, but will be placed just as they might have been in the house of one of the most magnificent patrons of the golden age, assembled with furniture and other precious things, all bearing the character of a taste educated to the worship of beauty.

What has been done so far in the Palazzo di Venezia gives, as we have said, great hope in one direction, but great fear in another. No fewer than six offices of state departments have been located in the old building of Pope Barbo, and those who know the inherent obstinacy of bureaucracy might fear that the cause of the museum is lost forever. Further danger of similar occupation was narrowly avoided; one ex-president of the ministry thought of making the palace a seat for a military club, with kitchens and all other appurtenances, while another wanted to arrange it for government archives or other purposes. But notwithstanding these and other similar attempts to spoil the beauty of the palace, there is still ample room left to begin with, and to prevent further encroachment there is the great enthusiasm and invincible determination of the director, Professor Hermanin. So, if faith and enthusiasm must necessarily look largely to the future, there is already such a good beginning made that hopes for final success have a secure foundation.

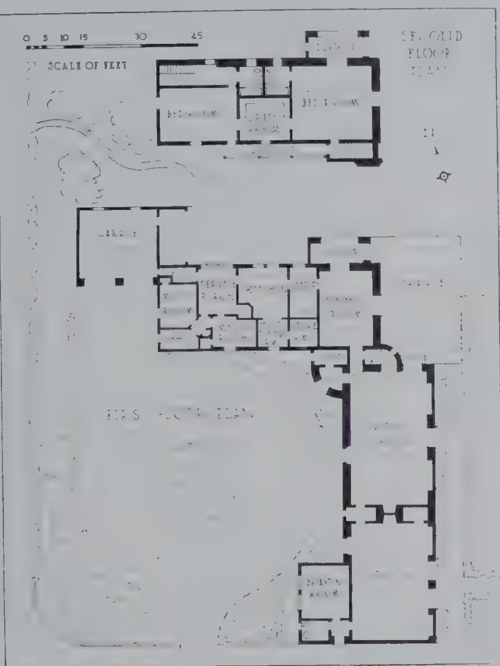
Elevation of Wall, Hall of the Mappamondo, Palace of Venice
Showing Montegna's Detail

Some Work of George Washington Smith

By WILLIAM WINTHROP KENT

IT has often been said that the most successful architecture in any country is that which is worked out in what was the original architectural type of that region. The early settlers of what is now the state of California, being Spanish, constructed their buildings in the Spanish style, slightly influenced in some few cases by Italian details, and by a happy circumstance this was exactly the architectural type best suited to the climatic conditions of the state. The early builders, therefore, set an example in the way of type, and the direct simplicity of their structures, which still exist after several centuries, points out the way to successful designing for architects who have come later. Many architects in California are today designing along the lines of Spanish or mediæval Italian architecture; many also trying to keep to simplicity in plan, elevation and detail whether in a purely Spanish, Italian renaissance or other vein. Of all these there are a few whose buildings are beautiful and successfully meet the exacting local conditions of climate, scenery, materials and labor, and among these men may be properly included George Washington Smith, of Santa Barbara.

It is easy to pursue too far any good style or character in design, especially when the designer feels, as many a Californian architect does, that he is traveling toward reform, if not actually on the path itself. The often subconscious impulse of the enthusiast is to go the limit or beyond, on the false theory that, if certain characteristics are good, their uttermost development must be better, and some Californian houses show the effect of this view. To expose the fallacy of such reasoning it is only necessary to remember that simplicity, for instance, which if properly followed is admirable repression, becomes, when unduly exploited, uninteresting crudity. Without emphasis of some sort a building cannot interest the eye. Remove too many mouldings and shadow-



Floor Plans of Casa del Greco

Casa del Greco, House of George Washington Smith, Montecito, Calif.


Two Views of Living Room in Casa del Greco

making projections and perforations from any construction, and the emphasis is lost. Mr. Smith has not made this mistake; although he is evidently a strong believer in getting back to certain first principles in house design, he is content with securing the characteristics of simple early Spanish or Italian architecture, and stops there, because he knows that these characteristics are all that are needed in the work he is doing.

By no means, however, is his work mere reproduction or adaptation of existing architecture in Spain or Italy, or in books and photographs thereof, but, starting with the usual inescapable given conditions, he merely works in this vein, because he believes that it brings the best results, and these results are, in toto, distinctly original. Like many another, he has looked ahead and seen that the average dwelling of the future must, from economic necessity, be kept free from all superfluity of plan, elevation and detail without, however, losing its interest for the owner and the society in which he moves. This is a progressive and wise view for, when our present economic upheaval has settled down, living conditions will make all illogical and overdone architecture more than ever ridiculous and impossible.

Let us see what we gain by building a country house in, say, twelfth century Castilian Spanish: First, the meeting of an owner's requirements by simplicity of plan; second, the logical use of available, substantial materials, such as stone or brick, or concrete, terra cotta and plain wood; third, simplicity in detail; fourth, the full utilization of the value of broad wall surfaces by careful study of openings; fifth, by cement stucco and hand finish, the harmonization of exterior with foliage, flowers and scenery in general, and of the interior with either richly carved or very plainly designed furniture. Briefly, all the design becomes a beautiful foil for some things or an appropriate accompaniment of others, and the chances are that with the growth of taste, both these qualities of contrast and harmony will be more and more appreciated by the general public.

It is always difficult to analyze design, to find wherein lies the charm of a good house, and harder


Two Views of Studio in Casa del Greco

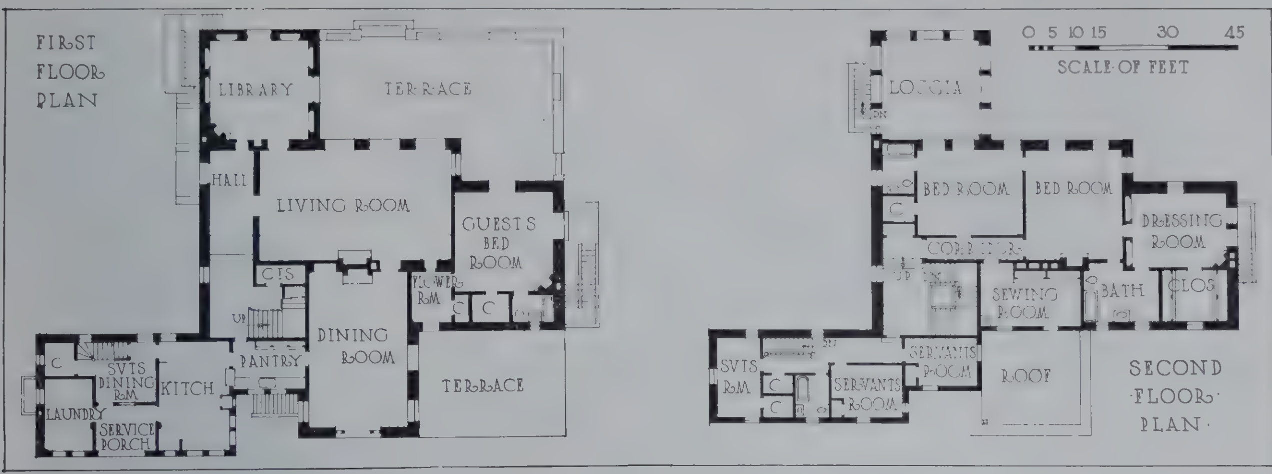
still to indicate wherein an architect has done original work and has shown his individuality. The adaptation, however, of beautiful ancient forms to modern uses often tells this, and in the use of perforated ornament, suggested by the rustic patterns of open brickwork for small windows, intended only for ventilation or similar practical purposes, Mr. Smith has shown commendable taste and considerable originality. In the utilization of the thick walls for cupboard and bookcase recesses, one sees quickly that he has not only realized the practical use, but appreciated the beautiful effect of such recesses by his emphatic and correct location of them. To find equally instructive examples on the exterior, it is necessary to note the butting of a lean-to roof against the higher plain wall of a main building, as in the Lindley house. Again in the Lindley residence the effect of weight as well as strength and security against too great a drip from the eaves has been secured by a bracket-like projection of the wall along the entire eaves. It is a question, however, whether

Detail of House of Mrs. De Witt Parshall

Floor Plans of House of Mrs. De Witt Parshall

Details of Entrance Front, House of Mrs. De Witt Parshall, Montecito, Calif.

HOUSE OF MRS. WILLARD P. LINDLEY, SANTA BARBARA, CALIF.
GEORGE WASHINGTON SMITH, ARCHITECT



Floor Plans of House of Mrs. Willard P. Lindley, Santa Barbara, Calif.

this detail does not involve the loss of much of the beautiful eaves-shadow, given by a greater projection of the tiles from a perpendicular wall. It is, however, in his unlabored designing of gently sloping tile roofs at different but logical heights, that he has secured some of his best effects in perspective. Anyone can cover simple walls with shed-like roofs, but to place those roofs so as to obtain picturesque and harmonious composition requires no small architectural ability. Sparingly has the curved line been used in Mr. Smith's work, either on plan or elevation, although on elevations, when the round or segmental arch is introduced, it is made effective by contrast with the lintel-supported openings of most of the windows; generally, however, the straight line and the rectangle are the controlling factors throughout.

The use of exterior staircases, for access to second story loggias and rooms, is made to contribute materially to the beauty of the exteriors by their carefully planned locations and treatment; the use of plain bracket forms to support landings is an aid in escaping the commonplace, and on the Lindley house a very broad and substantial air is secured at grade by continuing the terrace higher as a landing platform for the staircase. This landing turns the corner and reaches the lower terrace levels by a few more steps at front and back. If one might suggest any improvement in detail, which is not an essential factor in most of such work, it would be that the chimney pots offer a tempting chance to design more varied forms such as one sees a hint of at Capistrano, or might find in far-away Spanish Berlanga, Soria or somewhere in the wild province

Drawing Room Fireplace in Lindley House

House with Attractive Stucco Texture, at Santa Barbara, Calif.

of El Vierzo; but then again, one might not. However, Ruskin to the contrary notwithstanding, I believe in making a chimney pot as interesting as possible.

Also, it is well known that in metal working the Spaniards were from early days most famous, and in fertility of invention and beauty of execution not excelled, and possibly not equaled, by the Italians. Taking a hint from this, and from beautiful, but not intricate examples of balcony rails and window grilles, would it not be worth while to avoid the extreme simplicity of the usual plain iron bars, and design more decorative rails and window grilles, which could be made by local blacksmiths? Nothing of equally inexpensive character is of richer effect than that of well designed wrought iron against sunlit white walls, and a richer rural character might be preserved by its adoption, even in its less elaborate forms.

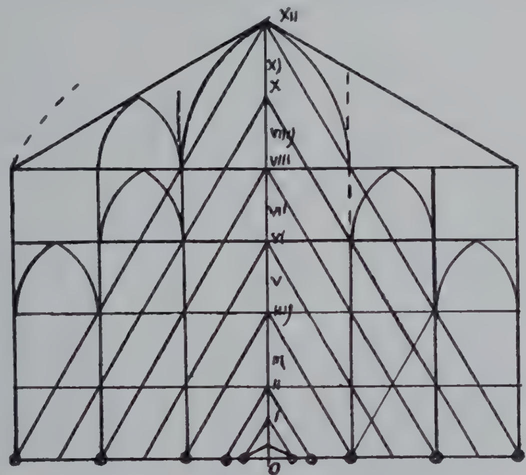
Eastern architects, who really appreciate the great beauty of much of the modern Californian architecture, are also apt to say, "Yes, it's charming, but we cannot do work like that in our climate." True, in one sense, but in another we can learn much from a study of its best characteristics and improve immensely on present work, by grasping why and how the best architecture of the Pacific coast is produced, for aside from the difference in climate, we can secure equally good results elsewhere, if sufficient effort be given to the work.

Gateway, Estate of Mrs. Mary E. Stewart, Santa Barbara, Calif.

Proportion in Architecture

By WOLDEMAR H. RITTER

EVERY architect and every intelligent critic of architecture will admit that a knowledge of proportion is fundamental for all good architectural composition. They will go further and grant that good proportion constitutes good architecture; that without it a building, no matter how convenient, how skillfully constructed, how well ornamented, is not architectural and that such designing is not a fine art. But when the architect or critic of architecture attempts an analysis of this fundamental element, proportion in architecture, the logic he used in defining the art deserts him, and he resorts to vague generalities. The architect, getting down to his problem of design in a given building, solving the utilitarian side of the project, gropes about like a blind man or strikes off a sketch as a gambler would flip a coin, to see if he can hit upon something. When he finally arrives at a satisfactory composition the route he has traveled has been long and tedious and the traits of character that have won the day are more likely to be perseverance and skill in elimination than that rare quality supposedly at the base of all good design, an intuitive sense of proportion.



Facsimile of Section through Milan Cathedral.
Drawn before Construction in 1391
by Stornalocho

It never seems to occur to most architects or art critics of today that proportion in architecture is something to be comprehended and grasped and used as a science or a system, and not to be experienced as a dream or inspiration. It is a part of the architect's training to think of design as a trick of the trade. As a student he is asked to present a sketch for a commemoration monument. For such a problem he goes to the triumphal arch of the Romans or the Monument of Lysicrates, or to some other design that he appreciates as good, though he does not know why, and he works out a copy with a variation —what he would call in modern slang a "cold crib" —and the proportions may be right or wrong; he has no way of checking it up except by the verdict of those of more experience who may call his monument a "first mention," or pass it by without remark.

In our modern building we use mechanical methods undreamed of by the constructors of pyramids, temples and cathedrals. Never has there been greater activity in monumental building or greater skill in construction. But on the side of proportion we have made no advance; beauty has failed to keep pace with utility. Little of our work will stand the test of time artistically, and none of it will rank with classic precedent.

The thoughtful architect of today is questioning and is discovering. He knows that architecture is now acknowledged as a fine art, as one of the greatest if not the greatest of the fine arts. As an artist he is aware of the lack of good proportions in the buildings around him and conscious of the beauty of the best work of the past. Such a contrast stimulates his mind to inquire whether the good qualities of work in the past were obtained by lucky experiment or by some scientific method unknown to him. A definite question is in his mind. Was there not a body of rules or fundamental principles underlying the proportion of architectural forms in the past?

If he turns back to the one piece of documentary evidence of Roman times, to the book of Vitruvius, written in the golden age of the Roman Empire, he will read in the second chapter of the third book: "There is nothing to which the architect should devote more thought than to the exact proportions of his building, with reference to a certain part selected as a standard." But Vitruvius tells him only what was good to be done; he never explains how this can be done, assuming in us a familiarity with rules which at his time were the common property of the profession. Of the various attempts to formulate these principles the one most familiar to the modern architect is the article on "Proportions" found in Viollet-le-Duc's *Dictionnaire Raisonné*, Vol. VII, p. 532. In this discussion Viollet-le-Duc emphasizes the fact that good proportions depend not only upon the relations of cardinal dimensions, but also upon the relations between the primary and subordinate features of a structure. He crystallizes his ideas into the well known "theory of triangles." After marshaling an imposing array of classic specimens of architecture, he tries to prove that one of his set of three definite triangles was used as the fundamental figure of design by the creator of each.

Although Viollet-le-Duc suggested a splendid working theory, he has fallen short of the mark by failing to make it sufficiently general to be applicable to all forms of architecture. The fact alone that he limits his theory to three fixed triangles is a handicap; indeed the triangle as a ground figure is

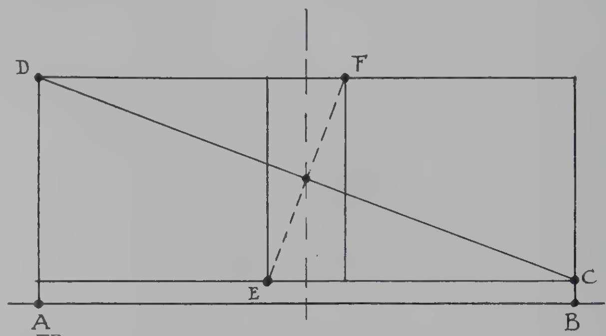
a poor choice since the eye can rarely comprehend at a glance all three apices of a triangle, and beauty of proportion cannot depend upon a number of points which the eye is unable to see at one time.

A present-day development, in reality an amplification of Viollet-le-Duc's theory, has been worked out by Prof. August Thiersch, who contends that good proportions are based upon similar rectangles, the diagonals of which are parallels, the two diagonals of any rectangle forming triangles, but not necessarily of Viollet-le-Duc's three types. Prof. Thiersch brings forward a long list of examples to prove his contention, with illustrations taken chiefly from the monuments of Greece and Rome, but also from the works of the middle ages and from the renaissance period. He shows, for instance, that on the Temple of Athena at Ægina, the entablature, two adjoining stones of the architrave, the abaci of the caps, the triglyphs, capitals, and the mutules with their supporting bars, all form rectangles whose sides bear the relation of 1 : 6. Another of Prof. Thiersch's examples is the Villa Farnesina where the wing of the villa, the two orders, the windows and their architraves, all form similar rectangles, the ratio of their dimensions, however, being impossible of expression in simple numbers. (See diagram.)

In discussing the problem Prof. Thiersch contends that harmony in design consists in the repetition by the subdivisions of the basic figure of the structure; in other words, in the analogy of the part to the whole. This ground figure, although not necessarily pleasing in itself, by repetition produces an effect agreeable to the observer, and the individual impressions received by the eye are merged into a pleasing composite. The simpler the relations of the parts to one another, and the oftener they are repeated, the more easily can the mind grasp the total effect. He adds, however, that mere repetition of similar figures, without contrast and variation, would soon become colorless and tedious, and that the mere application of a rule can never create a masterpiece.

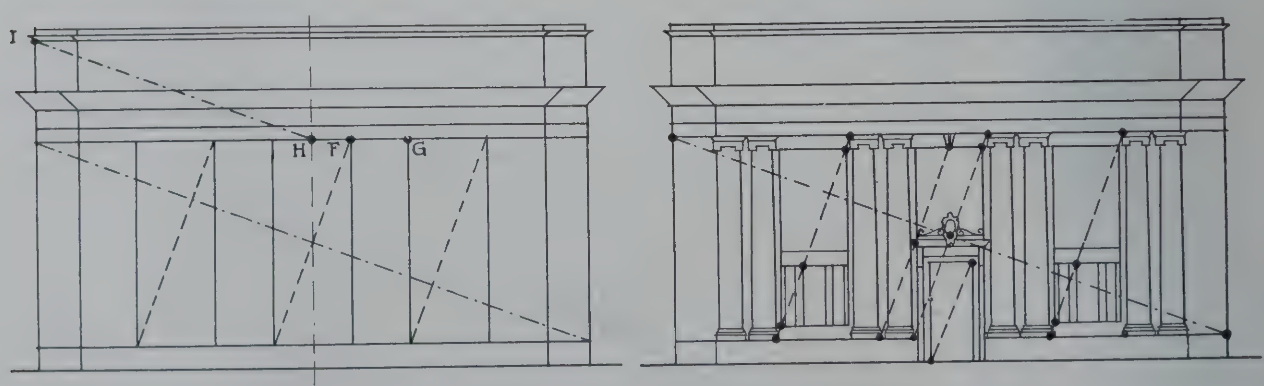
This theory is an advance over Viollet-le-Duc's, for it frees us from the limitation to three definite triangles. Moreover it contains a new and more comprehensible idea, since it emphasizes the rectangle as the ground figure, and the rectangle is the constantly recurrent figure in architectural design. Yet it remains a theory based on a ground figure, and therefore only too often dependent on imaginary points.

One readily observes that the few other discussions of this problem, like the two already mentioned, concern themselves fundamentally with oblique lines, whether their proponents call these lines sides of triangles, diagonals of rectangles, or by any other name. This similarity is so striking as to lead to the belief that the advocates of all these have based their theories upon certain theoretical lines found in a number of mediæval drawings handed down to us, lines which we must feel were drawn for the purpose of determining the proportions of buildings of different types.



AB = WIDTH OF PROPOSED BUILDING
AC = HEIGHT OF BASE
BD = HEIGHT OF CORNICE, DETERMINED BY NECESSARY HEIGHT OF MAIN BANKING ROOM
CD AND EF PRIMARY AND SECONDARY DETERMINING LINES OF DIRECTION
FG = WIDTH NEEDED FOR DOUBLE ORDER
HI = HEIGHT OF BUILDING DETERMINED BY SHADOW LINE OF PARAPET CORNICE

Take, for instance, the different cross sections drawn by Stornalocho in 1391 for the then proposed Cathedral of Milan, of which one is shown here. Into these cross sections are drawn a series of similar isosceles triangles. These have their bases on the floor line while their legs start either in the centers of the piers or of the aisles, and after passing through the spring lines of the vault arches, end in the



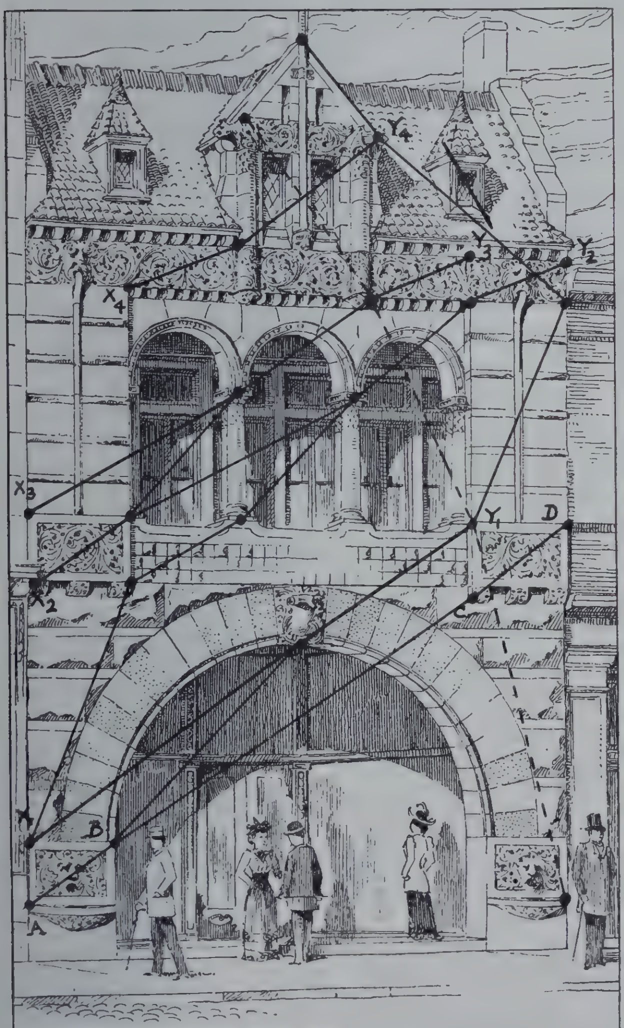
Diagrams Showing Development of Design of Building for Malden Savings Bank, Malden, Mass.

Monks & Johnson, Architects and Engineers

apices of the vaults of nave and aisles respectively. Not only are such triangles or diagonals preserved in the few mediæval drawings we possess, but they can readily be drawn into sections and elevations of countless classic examples of architecture, as Viollet-le-Duc has amply shown, and this is true not because the architects of those buildings worked with mystic figures or numbers, but because they recognized a fundamental fact of psychology.

In everyday life this principle is constantly made use of. Take, for example, the checker board; everyone appreciates without effort its regularity and would instantly detect a unit dissimilar to the rest. Likewise, the windows of an elevation are arranged in horizontal and vertical rows unless the designer wishes to stamp some special feature upon the attention of the observer. When the eye views checker board or facade it does not travel back and forth along the horizontal or vertical rows of units, but instinctively sweeps the diagonals of these, attracted by the corners of the individual features, rather than by their fields. As each corner of a door or window is a fixation point for the eye, so every base, cap, buttress offset or similar prominent fea-

Wing of Villa Farnesina, Rome
Facsimile of drawing by Prof. August Thiersch



A, B, C, D, is a good "determining line of direction." The broken lines might easily have been straightened into "parallels of direction"

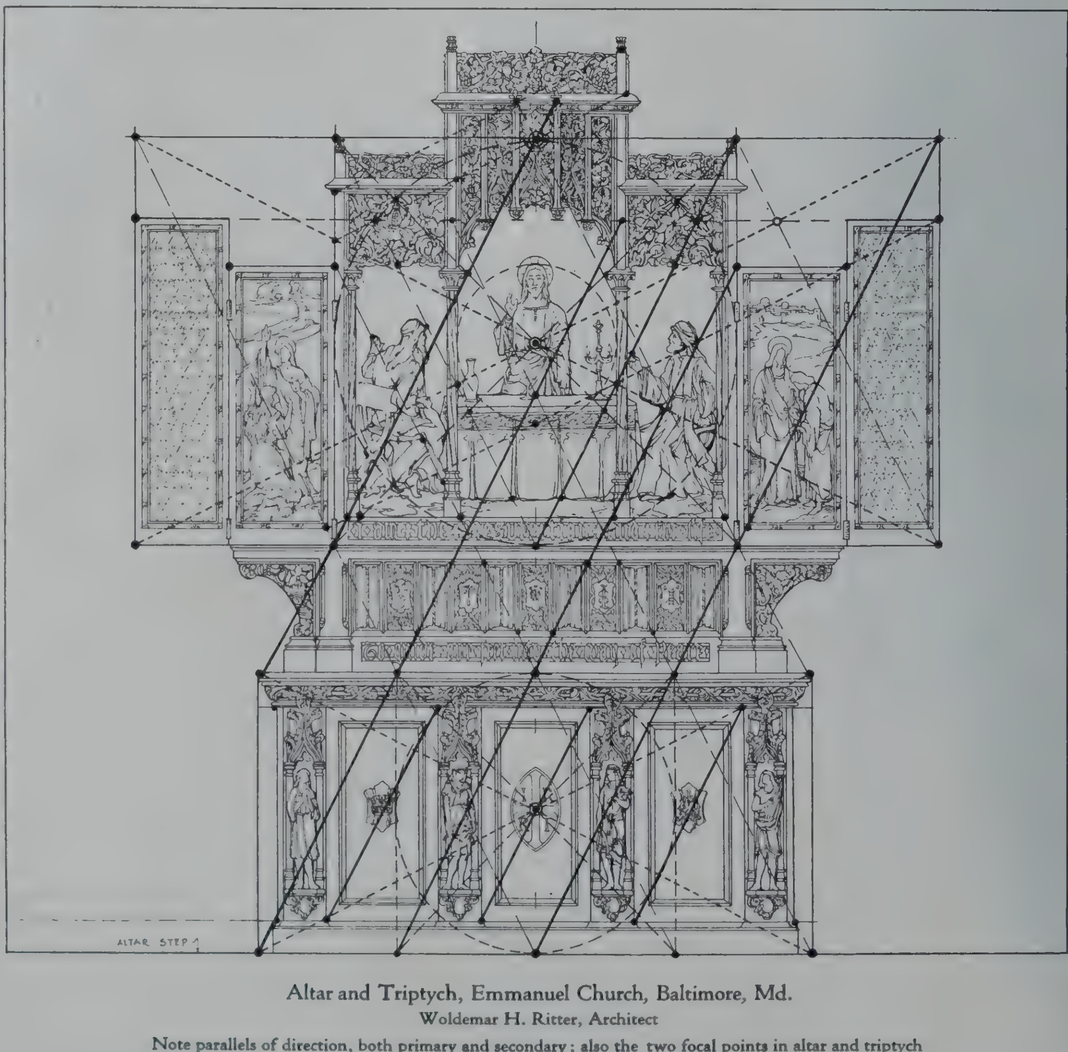
ture draws the attention. We call a window high or low according to the relation between height and breadth, *i.e.*, according to the pitch of the diagonal, which is but the resultant of these two dimensions. Through taking advantage of this habit of the eye and brain the architect can guide the glance of the observer by the design of his structure. If he arranges cardinal points on parallel oblique lines, the eye can travel along a natural path — the diagonal — gaining at a glance the resultant which is the relation of the two dimensions, height and breadth.

After sketching roughly a facade, and locating the features fixed by necessity, it is an easy matter to adopt a diagonal which shall serve as the "determining line of direction." (See illustration of bank design.) The chord of an arc, or the diagonal of a dominant rectangle furnishes in itself a decided oblique line. This determines the slant of the diagonals on which subordinate points must be located in order to give the observer the feeling of quiet and satisfaction called beauty. In addition

to this primary oblique line or "determining line of direction," the perpendicular to it will prove useful. Parallels to these two lines might be called "primary and secondary diagonals," and important corners should be located not only in the path of the primary, but also of the secondary series, and their intersections. These two sets of lines are distinctly interrelated and helpful one to another. The use of these lines will save the designer endless experiment in locating belt courses, cornices, window levels or such ornamental features as he may wish to introduce into his elevations. To the practical man the application of these principles may at first appear a waste of time. After a little study, however, he will discover that he can save the time formerly spent in going over and over his drawings, feeling after something which can be had by the application of a simple rule.

Just as the "determining line of direction" guides the eye in its wanderings over a facade, a circle will naturally catch it and fix it upon a certain feature. If, therefore, it is desirable to confine the attention of the observer to a limited field, circles or a series of other concentric figures may be introduced; even the discredited square here becomes desirable. It is remarkable how often this form may be detected in classic buildings, carefully camouflaged it may be, but still there, to do its duty in the eye of the observer.

Every architect will admit that similarity of proportions and the proper arrangement of individual features are fundamental requisites of a pleasing picture — indeed they are elements of beauty. No rules will make up for a want of genius, and no application of a principle will create a master architect, yet a knowledge of such rules will be of service to talent and shorten the long and weary road of experimentation. The result of a little effort spent in arranging dominant and subordinate features of telling members on "determining lines of direction" is truly surprising. Such purposeful application of a few simple principles is sure to enrich the artist's design with the desired grace and harmony. No longer need the eye of the observer zigzag wearily hither and thither over a facade in the effort to comprehend its general effect. The eye will glide easily along the lines of least resistance, intentionally chosen by the architect for this purpose, and will receive one harmonious impression with that pleasure afforded by a successful design.



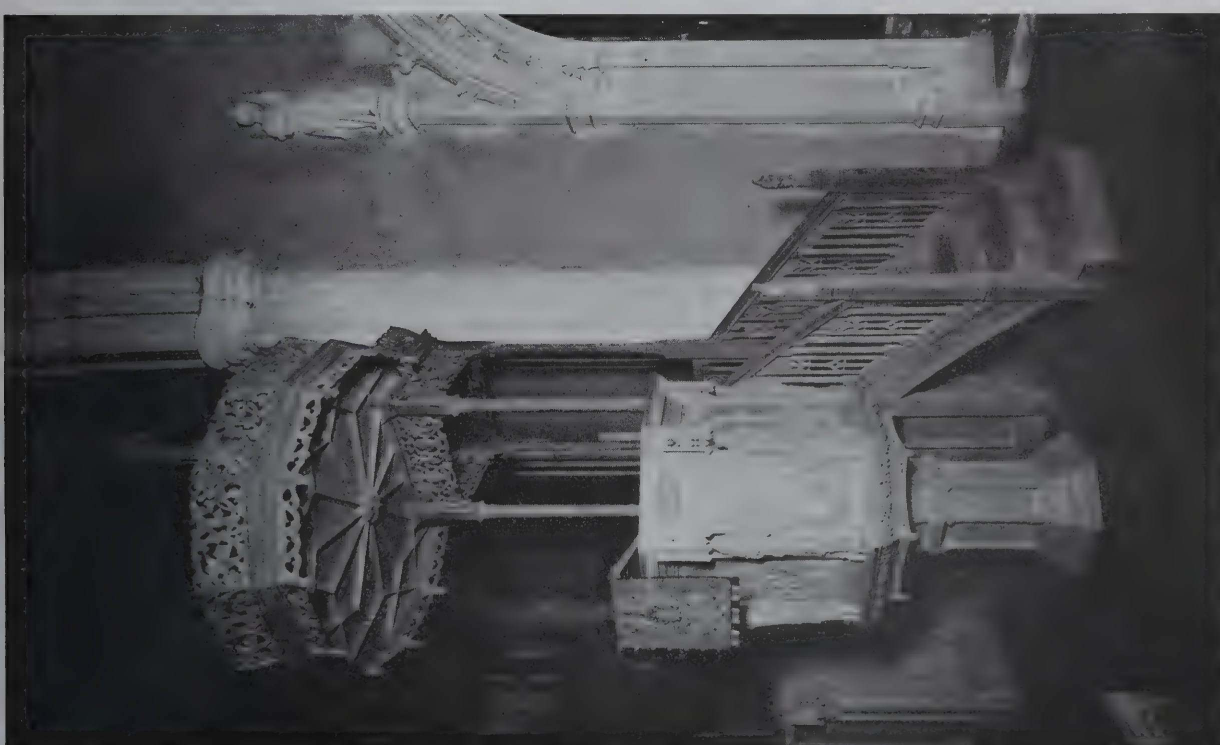
Altar and Triptych, Emmanuel Church, Baltimore, Md.
Woldemar H. Ritter, Architect
Note parallels of direction, both primary and secondary; also the two focal points in altar and triptych

VIEW OF CHAPEL FROM AISLE OF CHURCH

PEACE CHAPEL, EMMANUEL CHURCH, BALTIMORE, MD.

WOLDEMAR H. RITTER, ARCHITECT

DETAIL OF CHAPEL ALTAR

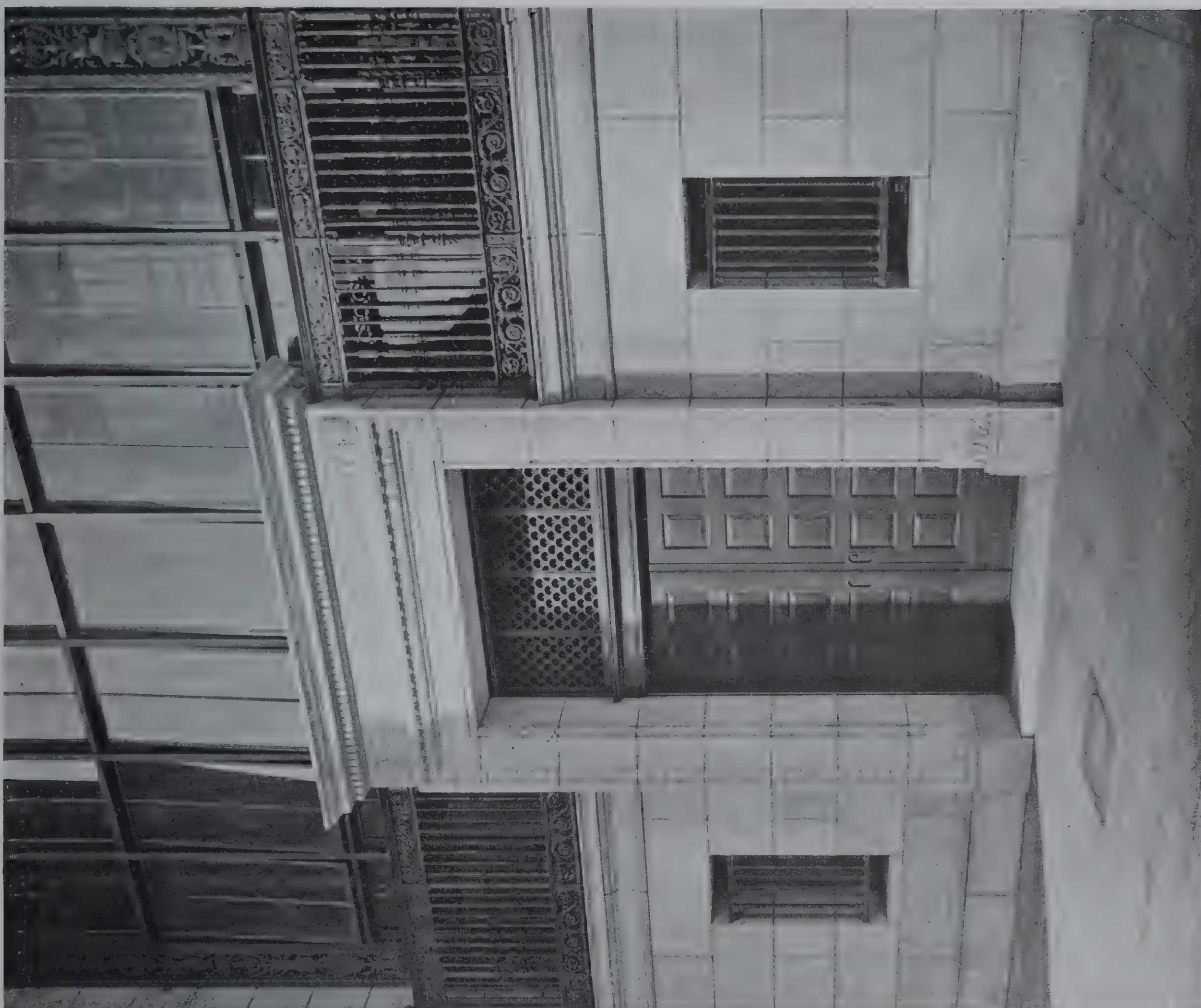


DETAIL OF PULPIT

PEACE CHAPEL, EMMANUEL CHURCH, BALTIMORE, MD.

WOLDEMAR H. RITTER, ARCHITECT

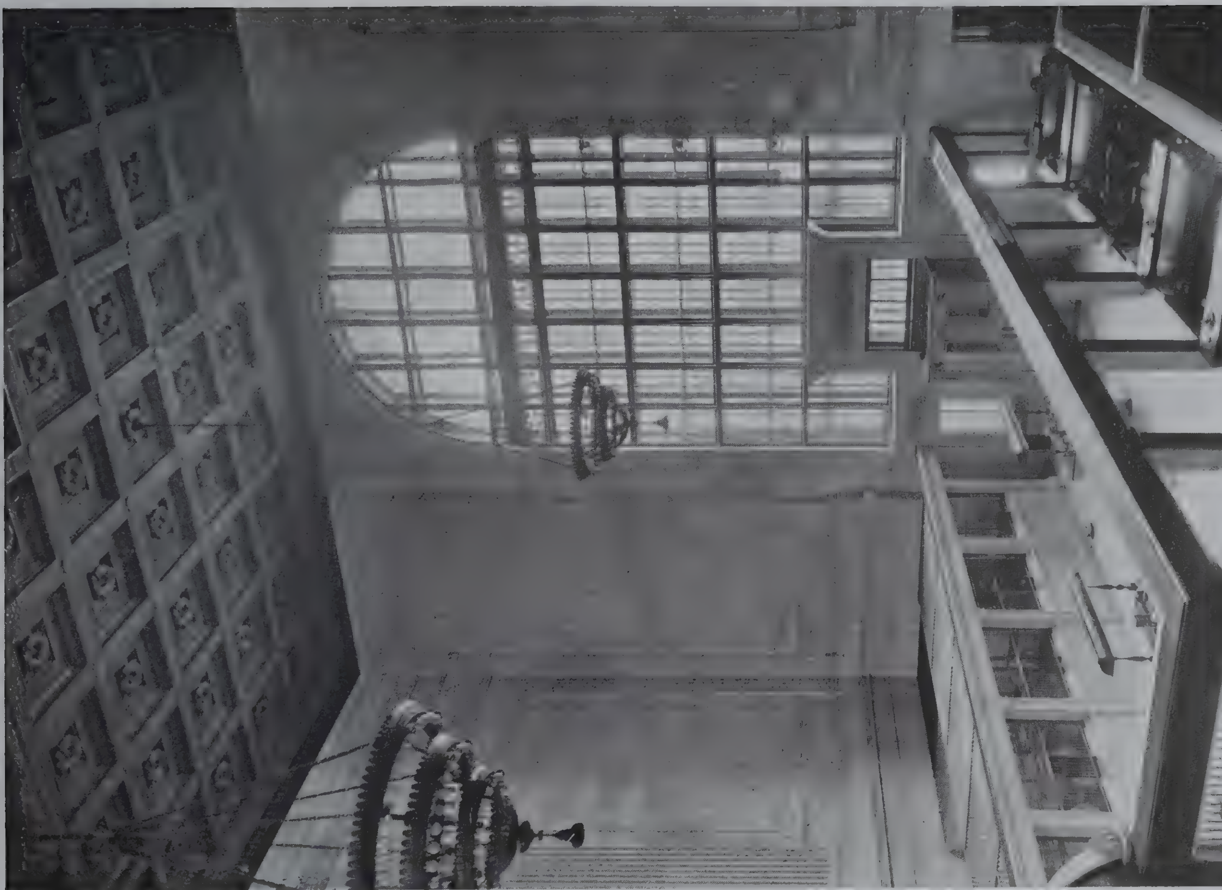
EXTERIOR VIEW



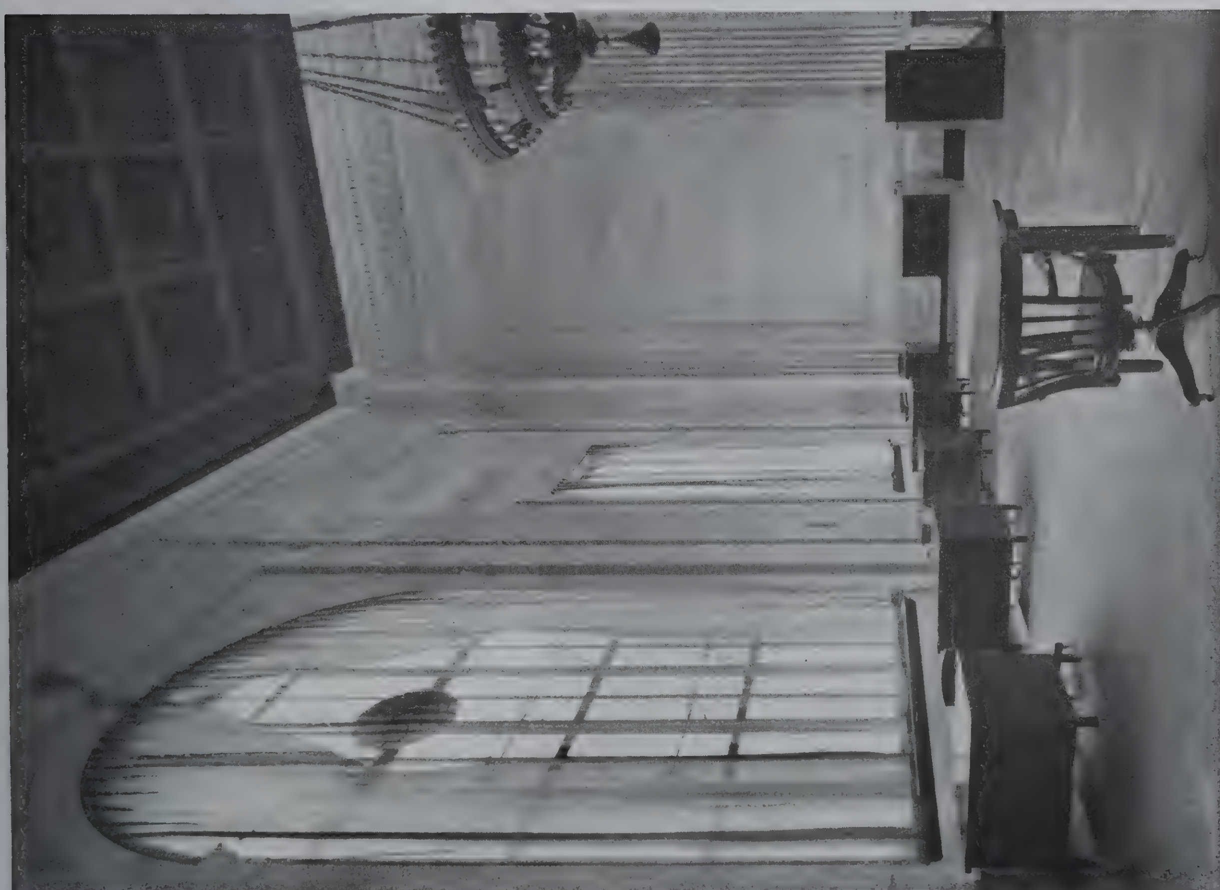
DETAIL OF ENTRANCE

VIRGINIA TRUST COMPANY BUILDING, RICHMOND, VA.

ALFRED C. BOSSOM, ARCHITECT



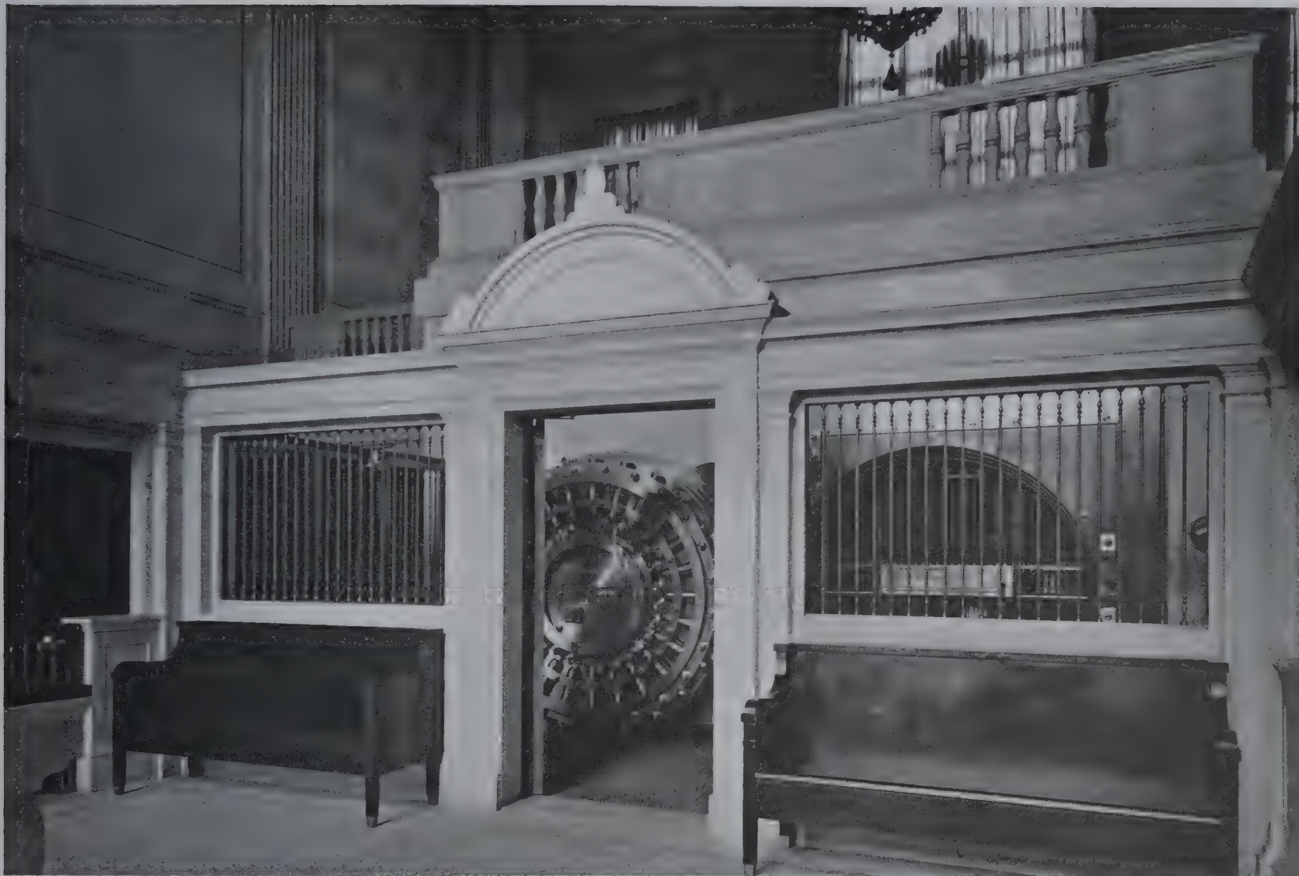
INTERIOR OF BANKING ROOM



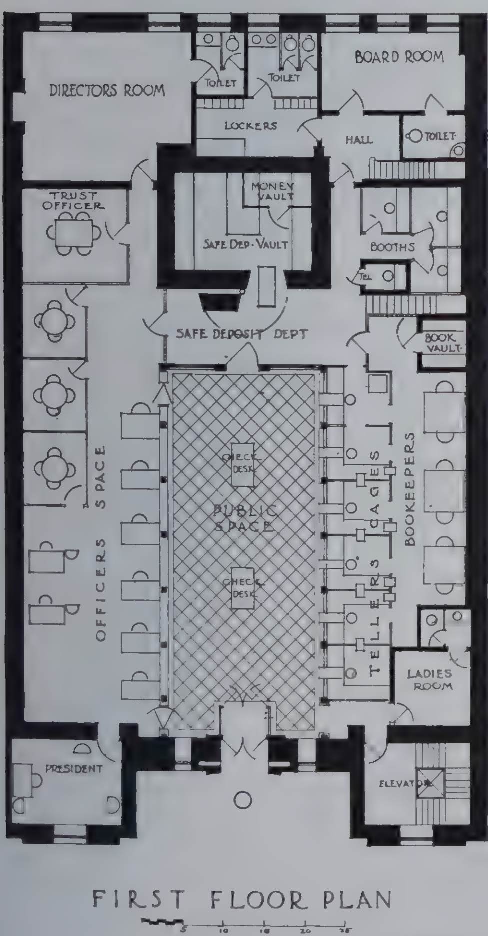
BALCONY OVER VAULT

VIRGINIA TRUST COMPANY BUILDING, RICHMOND, VA.

ALFRED C. BOSSOM, ARCHITECT



ENTRANCE TO SAFE DEPOSIT VAULT



FIRST FLOOR PLAN

VIEW IN WORKING SPACE

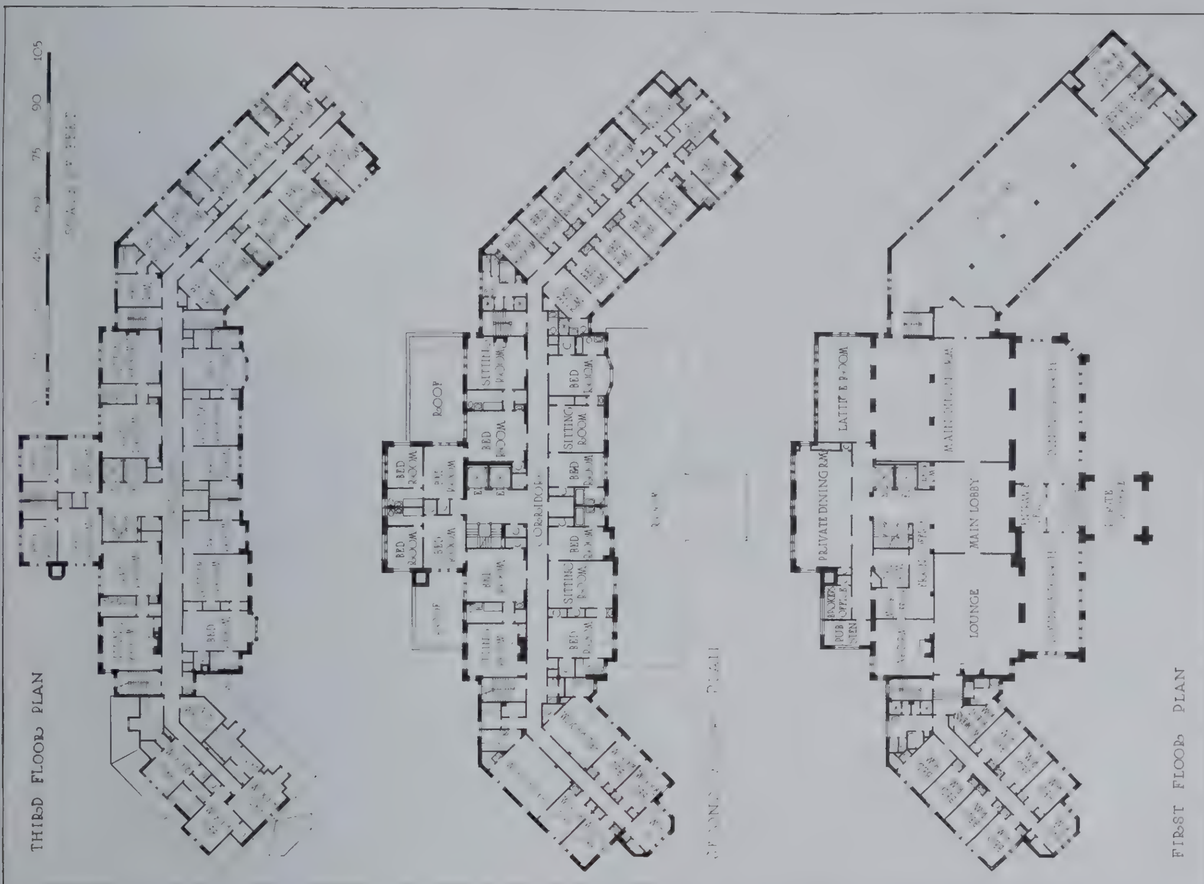
VIRGINIA TRUST COMPANY BUILDING, RICHMOND, VA.

ALFRED C. BOSSOM, ARCHITECT

GENERAL EXTERIOR VIEW

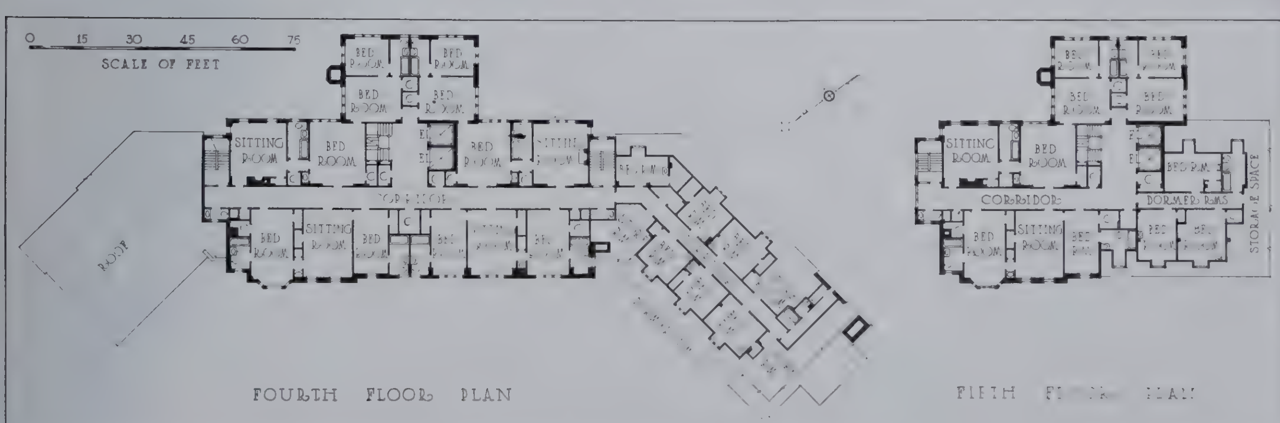
PICKWICK ARMS HOTEL, GREENWICH, CONN

FRED F FRENCH COMPANY, ARCHITECTS



PICKWICK ARMS HOTEL, GREENWICH, CONN.
FRED F. FRENCH COMPANY, ARCHITECTS

VIEW FROM DRIVEWAY



PICKWICK ARMS HOTEL, GREENWICH, CONN.

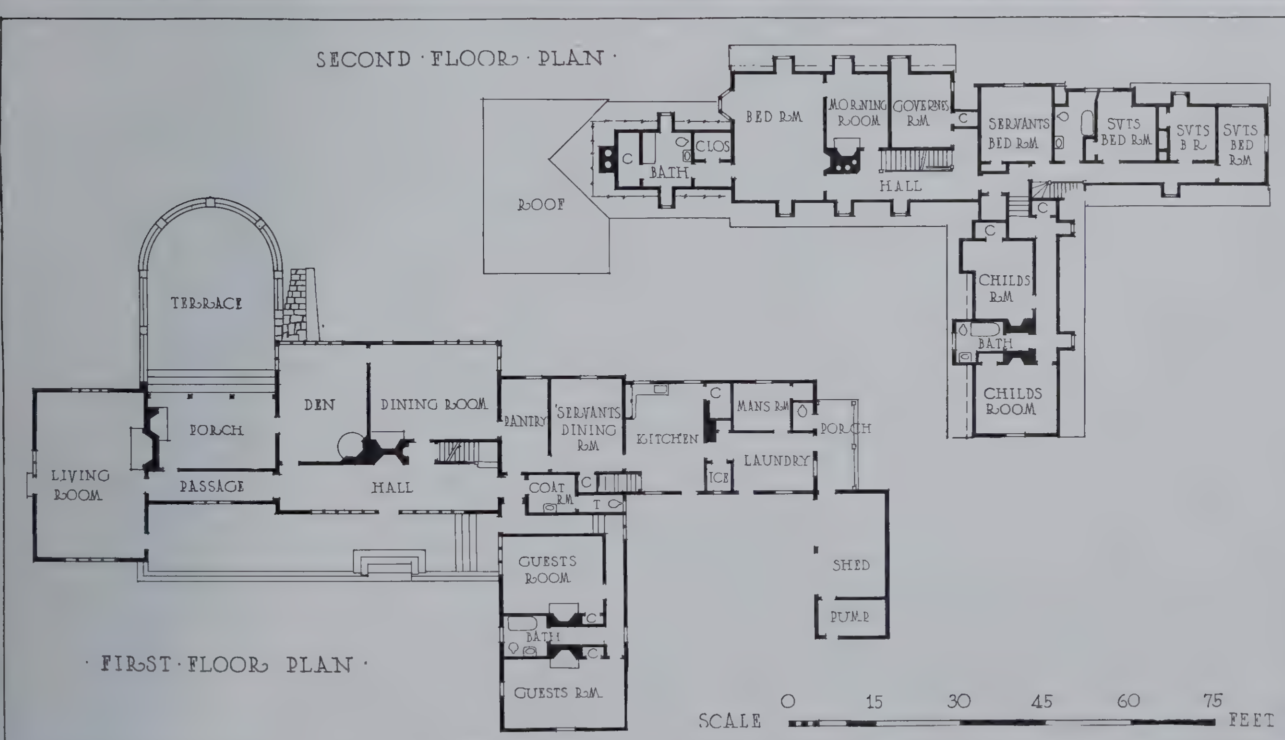
FRED F. FRENCH COMPANY, ARCHITECTS

SKETCH OF ENTRANCE FRONT

ENTRANCE FRONT FROM FORECOURT

HOUSE OF MRS. A. J. ANTELO DEVEREUX, DARK HARBOR, ME.

MELLOR, MEIGS & HOWE, ARCHITECTS



WATERSIDE OF HOUSE

HOUSE OF MRS. A. J. ANTELO DEVEREUX, DARK HARBOR, ME.

MELLOR, MEIGS & HOWE, ARCHITECTS

VIEW OF GUEST WING

LIVING ROOM GABLE

HOUSE OF MRS. A. J. ANTELO DEVEREUX, DARK HARBOR, ME.

MELLOR, MEIGS & HOWE, ARCHITECTS

PORCH AND TERRACE ON WATERSIDE

ENTRANCE TO GUEST WING

HOUSE OF MRS. A. J. ANTELO DEVEREUX, DARK HARBOR, ME.

MELLOR, MEIGS & HOWE, ARCHITECTS

Land Drainage

How It Affects Architecture and Landscape Architecture

By F. W. IVES

Professor of Agricultural Engineering, Ohio State University, and President of the Agricultural Engineering Company

THIS is the first of a series of articles to be presented in THE FORUM *by members of the Consultation Committee on their respective subjects. Others will appear in subsequent issues regularly.* — THE EDITORS.

THE success of a building project, whether it be a country house, a country club, or a farm building group, from an architectural standpoint, depends in no small measure upon the development of its surrounding plant life, and in turn plant life, roads, drives, building foundations and sewage disposal systems are dependent upon soil conditions for their success. Good drainage is the foundation stone of proper soil conditions upon which rests success or failure of any of the types of construction just mentioned.

When handling the drainage about farm or other country buildings, the questions of ground water and natural water table in the soil are likely to be left unsettled for the immediate problems of roof water, cellar drains, road drains and sewage disposal. Ground water is considered to be a matter for the agriculturist alone, as it is supposed to affect only plant growth.

As a matter of fact, however, if ground water is properly taken care of, the drainage of roads and buildings is a much simpler problem. The mere drainage of soil, from an agricultural standpoint, changes various soil characteristics and such drainage:

1. Raises soil temperature.
2. Aerates the soil, introducing nitrifying bacteria.
3. Oxidizes and makes available plant food.
4. Lowers water table permanently.
5. Establishes channels for flow of ground water.
6. Makes soil more friable.

All of this has a direct bearing on construction and related activities:

1. Higher soil temperature aids landscape architecture by making possible earlier plant growth in spring; enables the architect and builder to start building construction and road work earlier in season.
2. Soil aeration assists in the sanitary disposal of household and barnyard wastes by the economic process of sub-surface irrigation secondary disposal systems.
3. Oxygen in the soil assists in final disposition of septic tank effluent.
4. Lowered water table makes better and more permanent road foundations; prevents dampness in cellars or basement stories; prevents large surface run-off by increasing absorptive capacity of the soil; affords better conditions for plant growth for practically all ornamental high ground shrubs and decorative plants.
5. Channels for flow of ground water are established within a year after installation of tile drains and make for rapid drying of tennis courts, golf grounds, roads, etc., after heavy or severe rains.
6. Drainage changes the nature of soil by making it more workable. The changed soil makes more easily cared for courts, gardens and other forms of landscape construction.

Another general consideration is the protection of water supply by artificial drainage. Such drainage may be used in several distinct ways, of which disposal of surface run-off and sewage wastes are the most important. The control of surface run-off consists mainly in taking care of the occasional freshets in natural water courses after a heavy rainfall, thus preventing flooding of springs and consequent fouling of water supply. The control of surface run-off also prevents erosion of natural or artificial landscape constructions. The sanitary disposal of sewage by the sub-surface irrigation method is quite satisfactory so far as irrigation and avoiding the pollution of air are concerned. In a very wet season, however, sub-drainage of the irrigated section must be installed in order to take care of excess water and direct its flow from channels leading to natural sources of water supply, such as springs and wells, and toward such channels as legal drainage restrictions may designate. The effluent from the sub-irrigated beds is generally not dangerous to health except under extraordinary conditions or because of poor design of the plant at the outset, but there is always a feeling, hard to overcome, of prejudice against waters emanating from such sources.

Other problems intimately associated with drainage in their solution are those of efflorescence on retaining walls; overturning of retaining walls and garden ornaments by action of frost; destruction of walks and drives by frost; winter damage to swimming pools, fountains and similar details; care of barnyard waste, sunken gardens and sunken farmyard courts; inundation of golf courses and country club grounds by streams.

The first care of the engineer in planning an adequate drainage system is to provide an outlet; the second step is a careful topographical survey of the whole drainage area and the next step is then a study, with the architect and the landscape architect, as to the location of buildings with respect to topography and their relations to one another. The last step before beginning construction is the prep-

MAP OF PROPOSED AGRICULTURAL SECTION OF OHIO STATE UNIVERSITY
JOSEPH N. BRADFORD, UNIVERSITY ARCHITECT; F. W. IVES, AGRICULTURAL ENGINEER

aration of plans and details. The outlet is most important on account of state laws covering riparian rights and damage by artificial water courses, and also on account of sanitary rules of state and city boards of health. Almost as old as the ancient fence feuds are the questions of receiving drainage from the uplands of a neighbor. A topographical survey of the whole drainage area is necessary for three reasons: (1) To plan properly the drainage of the area under consideration. (2) To determine, so far as possible, the effect of run-off from land higher up. (3) To ascertain the legal restrictions pertaining to outlet on the property below. Many times the question of flow from higher property is more serious than that of the drainage from the site itself.

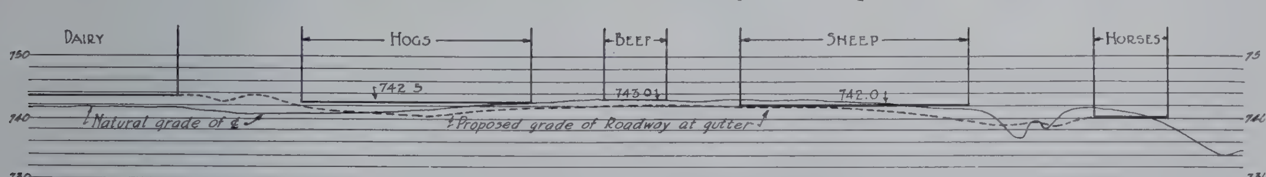
Naturally enough the architect, landscape designer and engineer must agree as to the proper relation of site and buildings. A few general principles on which to base agreements should be understood in connection with farm groups:

1. Drainage should be from residence to barn rather than from barn to house.
2. Drainage should protect all sources of water supply.
3. Southern or eastern slopes are most suitable for all farm buildings.
4. Prevailing winds determine to some extent locations of buildings, *i.e.*, stable odors should be carried away from the house.
5. Questions of drainage affect location of all drives, walks, tennis courts, sunken gardens and barnyards.
6. Economic working of farm plant, though sometimes overlooked in favor of a "picture farm," must not be neglected. Few country places pay money dividends, nevertheless many large estates do pay their own way, which doubtless contributes not a little to the peace of mind of their owners.

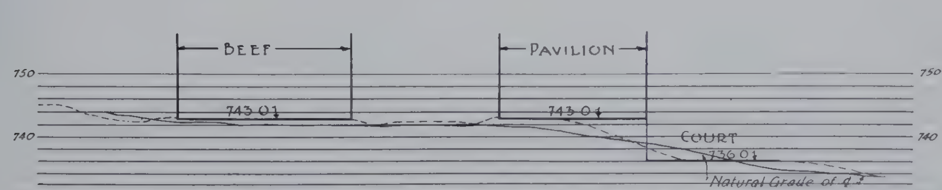
A typical drainage problem relating to a farm building group is found in the proposed group for the Animal Husbandry Department, Ohio State University. This problem involves run-off from property above, drainage of fields about the plant, drainage outlet, sewage disposal, drainage of disposal field, and omits only the drainage as affecting the water supply. The topography of the site, as shown in the map, is of a medium rolling character with no very steep slopes. The soil is a heavy clay, very dense and inclined to hold water. Drainage from approximately 400 acres above flows through a culvert under a railroad at the west of the tract. This flow was originally conducted in an ordinary field drain, not sufficiently large to carry freshets. The remainder of the original drainage on the tract is barely sufficient to permit the land to be cultivated, no pretense at complete drainage being made. In the consideration of this problem, the former drainage system has practically no bearing excepting that a portion of it will have to be replaced with units of larger capacity.

The building location and the relative positions of the various structures with respect to management, capacity and ornamentation and the preliminary studies for the building plans were worked out in the office of Joseph N. Bradford, University Architect, with the Departments of Animal Husbandry and Agricultural Engineering in consultation. The group and its location having been decided upon, the problem of drainage was then taken up. It was first thought that the drainage from the higher ground could be diverted along the railroad to another outlet, but this was abandoned after study. It was found that a 12-foot cut for a distance of 700 feet would be necessary. The railroad officials do not care to change the size of existing satisfactory culverts under a double track. Property owners receiving the increased run-off naturally expect a state-operated plant to pay large damages (alleged) to their property. In other words, riparian rights of a public utility and of individuals were involved.

Study of this problem indicated that a 30-inch



· PROFILE · SECTION ·
On North & South Axis or ℄ as shown on plan



· PROFILE · SECTION ·
On East & West Axis

sewer would carry the surface and ground drainage with a fair factor of safety. This sewer is provided with silt basins and clean-outs at points of change of grade, curvature and entrance of other drains. These are important matters in the carriage of waters laden with silt materials. Silt basins provide simply an enlarged and deepened channel where the abrupt entrance and exit of the water encourages the deposit of silt and sand. Man-hole and clean-out covers must be provided. The main sewer purposely follows the main roadway to take water from the gutters and surface inlets. At its lowest point the 30-inch main sewer is joined by a drain from some 200 acres to the north and then proceeds in a southerly course, passing under the river boulevard and finally into the river.

Four other typical drains are found:

1. Drains for water from roofs, paved courts and roadways.
2. Drains to lower ground water table about site.
3. Sanitary drains.
4. Sub-drainage of sanitary disposal fields.

The water from roofs, paved courts and roadways is carried by direct underground lines to the nearest convenient outlet. Regular inlets are provided at convenient intervals to guard against possible flooding. Six-inch tile are the smallest recommended for this service. Small tile are of little value as they soon become clogged and useless. Lawns and tempers are both ruined by tile replacement.

The drains for lowering water table serve several purposes in this particular case. The most extensive drainage is necessary just west of the group on ground of a higher elevation. These are ordinary 4-inch farm drains laid down the slope to a sub-main. Their purpose is to intercept ground water and to prevent surface water from reaching the courts and yards. It is believed that this drainage will better the grass in the large paddocks. Other intercepting drains are shown on the map. Since a dry yard is especially desirable in the case of sheep and dairy cows, underdrainage is very necessary.

The sanitary drains include vitrified sewer lines from the various buildings to the large septic tanks, of which there are two. The larger tank is designed to care for toilet and wash from the dairy barn, hog building and judging pavilion. The smaller of the two will take care of a comparatively small amount of waste from the sheep and beef cattle buildings and from the power plant, this latter built to include a small abattoir. Vitrified drains from the septic tanks to the dividing valve chambers are quite necessary in order to prevent pollution of the soil at that point. The disposal field consists of common farm drain tile, minimum size 4 inches in diameter. These tile are laid at a slight slope in cinders or gravel at a depth of about 18 inches from the surface. In closely compacted soils, the cinders or gravel should be 12 inches below the tile and 6 inches on either side, and should be covered with just enough soil to grow whatever crop is necessary. In gravel or sand, sub-drainage of disposal fields is not necessary unless some source of water supply is to be protected. In wet, heavy soils, particularly in regions of heavy rainfall, sub-drainage is extremely important. The heavy soil tends to become water-logged and would soon kill off desired plant growth. Plant life over the beds to utilize the excess of nitrogen deposited by the sewage is necessary. Vigorous growth can take place only under favorable moisture conditions.

The map clearly shows three disposal beds of ample area. The sub-drainage is shown as a gridiron formation. The sub-drains may usually be constructed of 3- or 4-inch farm drain tile from 30 to 40 inches below the natural ground surface, depending upon the available gradient, and midway between the disposal lines. All sanitary lines must be laid with a grade of ⅛ inch per foot or more. Vitrified sewer lines must be carefully graded and laid with cemented joints. All disposal tile and all drainage and sub-drainage tile must be laid with loose joints. Valves are provided so that portions of the disposal field may have periods of rest, since a continuous flow would soon render the plant inoperative or at least not safe.

Economical construction of drains is a matter of interest to the architect and owner as well as to the contractor. Drainage excavators or trenching machines are more economical than hand work on all save the smallest jobs. The cost of an installation of the size shown on the map may be cut 30 to 50 per cent by the use of machines in place of hand labor. It is important that, so far as possible, parallel lines be employed and that these lines be as long as grade conditions will permit. A good operator can finish a grade to a smaller fall with greater accuracy than most hand workers, and with much less supervision and inspection.

Two kinds of tile are available — clay and concrete. Which is selected will be largely a matter of price, delivered at the site. Since freight plays a large part in present prices, the nearness of a tile kiln or a cement products plant will have considerable bearing on the price. Generally speaking, large sizes of concrete pipe are superior to the smaller sizes, while the reverse is apt to be true of the clay product.

These publications are of value in the study of design of drainage:

E. G. Elliott. *Engineering for Land Drainage*, John Wiley and Sons, Inc.
E. G. Elliott. *Practical Farm Drainage*, John Wiley and Sons, Inc.
J. A. Jeffrey. *Text Book of Land Drainage*, The Macmillan Company.
H. F. French. *Farm Drainage*, Orange Judd Company.

The Division of Agricultural Engineering, Bureau of Public Roads, U. S. Department of Agriculture, Washington, D. C., has issued much valuable material and research data on drainage and drainage design. Various state experiment stations have done much valuable work, data regarding results being available in bulletin form. Notable among these is the recent work of Michigan, Wisconsin and Iowa. The Proceedings and Journal of the American Society of Agricultural Engineers also contain much valuable material.

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Steel Design for Buildings

PART II. THE DESIGN OF STEEL COLUMNS

By CHARLES L. SHEDD, C.E.

IN the May number of THE FORUM we considered the various types of columns and the points which were to be remembered in their design. In this number we will show a method of arranging the calculations for a column design and also the actual design of a column for a 12-story office building.

The loading on a column is made up of loads from several sources: 1st, the wall loads; 2nd, the live floor loads; 3rd, the dead floor loads; 4th, the column metal and covering, and 5th, any special loads such as from elevators, tanks, etc. In figuring these loads they are kept separate until the final summary is made in order that one can tell easily in that summary just how much of the total loading comes from each source. This may be especially useful in the designing of the foundations and in any case it makes the work systematic and easy to follow, and it also aids in estimating the effect of any changes and enables the person in charge of the work to look it over and note any possible error by comparison of the various totals.

In computing the wall loads, one sheet may be given to all the wall loads on all of the floors between any two columns. It is best to start at one corner of the building and work around the structure, taking each bay in order. The sketches for these wall loads are made in the same manner as those shown in the last article, where we considered the design of steel beams. Fig. 1 shows a typical sheet of wall loads. The wall is of brick, 1 foot thick, with a window 4 feet wide. The arrangement of the figures is similar to that in the design of beams but we stop when we have obtained the reactions and do not figure any moment. These calculations should be made before the spandrel beams are figured and then they may be used in conjunction with any floor loads to make up the sketches for the designing of those beams.

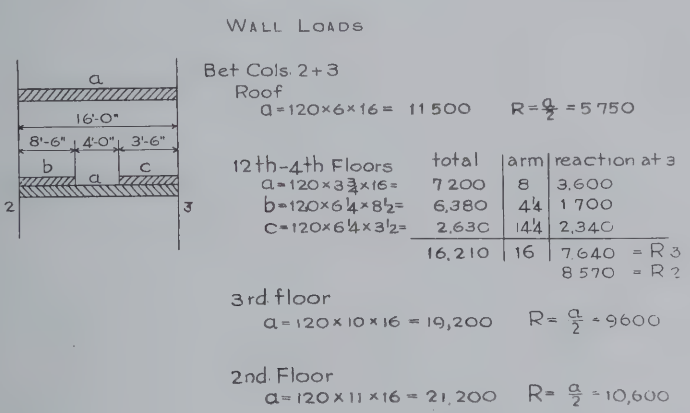


Fig. 1

NOTE.—This method of tabulation was explained in detail in a previous issue of THE FORUM

In Fig. 2 is shown a portion of a summary of these wall loads. This portion shows the summary of the wall loads for columns 1, 2 and 3. The building has 12 stories and the loads from the walls to the columns are all alike on the floors from the 5th to the 11th inclusive, so we bunch these all together to save time and space. The horizontal lines represent the spandrel beam at each floor and the vertical lines the columns, and the loads are entered from Fig. 1, etc. at each end of each beam and above it so that the work can be easily followed. Movable partitions are usually considered as part of the live load but permanent partitions may be figured and summarized with the wall loads. Column 3 has a load from a permanent interior partition, therefore there are 3 loads for that column on the wall load summary sheet. When these loads are all entered on the sheet they are added together for each column at each floor and the result placed below the horizontal line. It is convenient to let the vertical line pass between the hundreds and the thousands. The author usually

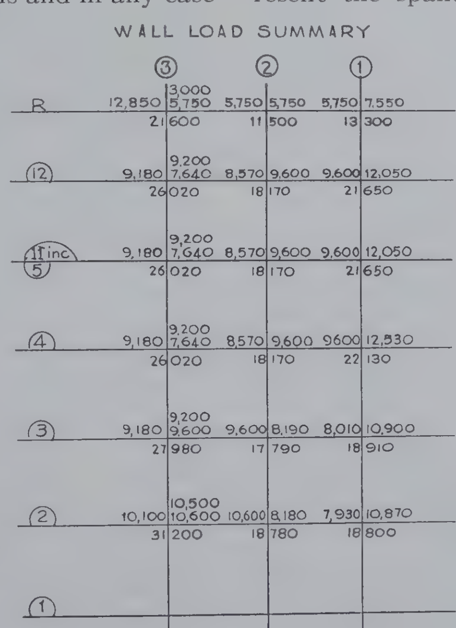


Fig. 2

makes the calculations thus far to the nearest 10 pounds, but when these are transferred to the final summary the nearest hundred or the next hundred above is generally used to facilitate adding up the items.

The live floor loads are figured as in Fig. 3, which shows a portion of such a sheet for the building we are using as an example. The 12th to 4th floors are all alike and are put together. The first vertical column shows the number of each column; the next 3 are areas of the various parts which make up the roof. These areas are figured from the plans and are the areas of floor in square feet which are transferred to each column. An easy way to figure these, where they are complicated, is to have blue prints of the framings made and mark quarter areas at convenient points on the plans similar to reactions of beams, and then follow them around, crossing off any as fast as they are divided into reactions nearer the columns. Finally the sheet will be covered with these numbers, crossed off excepting those around each column which may be added together on the blue print and that summary marked to distinguish it from the partials in some way, such as drawing a circle around it.

LIVE FLOOR LOADS FOR COLS.

Col. No	P.H. Landing @75# (Areas)	P.H. Floor @75# (Areas)	Main Roof @40# (Areas)	Total Load (* Roof)	12-4 Floors Area	12-4 Floors @75#	3d Floor Area	3d Floor @75#	2d Floor Area	2d Floor @75#	1st Floor Area	1st Floor @125
1			140	5,6	140	10,5	140	10,5	140	10,5	42	5,3
2			188	7,5	174	13,1	174	13,1	174	13,1	176	22,0
3	68		180	12,3	164	12,3	164	12,3	164	12,3	192	24,0
4	91		100	10,8	99	7,4	99	7,4	R60* 99	9,8	184	23,0

Fig. 3

On the roof of this building, as in many similar cases, the areas were of 3 classes — a pent house landing, which came above the main roof; a pent house floor, at about the grade of the roof, and finally the roof itself, which includes both the main roof and the roof of the pent house. These are kept separate on account of the loadings per square foot which vary, one being 75 and the other 40 pounds, and also to make the calculations easy to follow afterwards. Each of these areas is multiplied by the proper load per square foot and the sum of the items placed in the vertical column marked "Total Load." The last 2 figures are considered as ciphers and are omitted to save space, and also to make the work more rapid and less liable to error. The various floors are figured in a similar way. On the 2nd floor of column 4 in the area column is an item marked R60. This represents an area of 60 square feet from a roof at this level in a light well or areaway. This is multiplied by 40 pounds per square foot, like the regular roof loads, and added to the area 99 multiplied by 75 pounds per square foot, giving 9, 8, that is 9,800 pounds.

Fig. 4 shows the final summary for column 2. The column number is shown in the first column, the floor in the second, and the live floor load in the third. Most building laws allow a reduction in the live load on columns where several floors are carried. By this is meant that the law takes into account that while some areas may be loaded up to the full live load designated by the law, it is unlikely that all areas or floors will be fully loaded at the same time. To take account of this when a column carries 1 floor, the full live load is used; when 2 floors are carried only a percentage is required to be used, in this case 75%, and when 3 floors are carried a still smaller portion of the full load is used, in this case 60%, and so on. As the building grows larger and more and more floors are added it becomes desirable to stop this reduction and use a minimum per cent; in this case for 6 or more floors 40% of the total live load is used. This method of reduction is apt to vary with different building laws and it is said that one of the objects of Mr. Hoover's present work is to promote a uniformity of the building laws throughout the country. The system used here is according to the Boston building laws. The live load for the roof is not allowed to be included in the live loads to be reduced and is, for convenience of tabulation, included in the column of dead floor loads as noted by the asterisk.

The fourth vertical column contains the per cent of live load used in each case and this multiplied by the partial summaries in the third column gives the reduced live load in the fifth column. The dead floor is figured on a sheet corresponding and similar to Fig. 3 and is transferred to the sixth column. The wall loads are transferred from the wall load summary (Fig. 2) to the seventh column and the column metal and covering (C. M. & C.) is entered in the eighth column of the tabulation. By column metal and covering is meant the weight of the steel column itself and the fireproof covering and plaster around it. In a 12-story building this will average about 2,000 pounds per story so that if this is used as in the present example we are on the safe side in the upper stories and about right in lower stories.

In figuring the wall loads we figured from center to center of columns. In so doing, at the corners of the building we omitted a small bit of wall at the extreme corner. This can be readily computed and added to the C. M. & C. of these corner columns. It usually about doubles the C. M. & C. for these columns.

The items in each column are added up at each floor, these totals being placed below the horizontal lines, and the totals, beginning with the reduced live load, are added up crosswise and entered in the ninth vertical column. An adding machine proves very convenient on these sheets to use after the entries have all been made and the live loads reduced. The tenth column shows the story for

which each total load in the ninth column applies. The eleventh column shows the unsupported length of each column in each story and is usually about 1 foot less than the story height. The twelfth and last column contains the section required, taken from the standard sheet of tables which we will now describe.

As we noted in the May FORUM, different building laws use different column formulae. The formula used in this table is that most commonly used, that is 16,000-70 l/r. The maximum stress per square inch in this table is 14,000 pounds per square inch and the maximum l/r is 120. Various cities which use this formula vary these two limits. Excepting for these variations in limits this formula is used by the American Railway Engineering Association and the cities of New York, Chicago, St. Louis, Detroit and Seattle.

This table shows the allowable load in thousands of pounds for lengths varying by 1 foot for differing sections varying in area by small amounts. In order that the different portions of the column may be of equal strength the thicknesses of metal in any one section are made nearly equal. While the thick webs are not economical this is considered good engineering practice and some specifications require it.

Many offices have very little system in keeping their calculations, and while there may be others which are quite as good as that described in this and the preceding article, the author feels that this system has great advantages over the practice common in many offices. For instance, the building from which this data was taken had 229 pages of calculations on paper 8¼ x 11. The sheets having the beam calculations had 3 or 4 beams per sheet. The calculations were made in 368 working hours which included 101 hours for the author, chiefly in supervision and consultation with the client. This also included the time of a stenographer in making a copy of all of the sheets. The floor was a concrete slab on steel beams and columns. Drafting was not included in this time. The work was done by 5 men besides the author and their stenographer. Neither the men nor the stenographer knew anything about the system and no one but the author worked any time excepting evenings, Saturday afternoons and Sundays. Not including the time on preliminary consultation with the client and the days at the last in making the copy of the calculations, the work extended over 11 days. This will serve to give an idea as to what should be expected from a system of this kind when the work is a rush job.

In addition to the direct loading of columns there is often an eccentric loading. This may be caused by a load being applied off the center of the column or by wind stresses. In any case this loading may be expressed by a bending moment. The resultant stress in the column is equal to the moment in inch-pounds divided by the sectional modulus of the column section. In this form it is awkward to design the column section as the method would not be direct, but by changing the arrangement of the formula we may obtain an expression from which we can get the required area by a direct method. This formula for the required area would be:

$$\frac{\dfrac{My}{r^2}+P}{f}=A$$

where M is the moment in inch-pounds, y the distance from the neutral axis to the most stressed point of the column section, r the radius of gyration of the column, P the direct load on the column, f the allowable fiber stress and A the required area of the section. When the type of column has been decided upon it is quite easy to get the value of $\frac{y}{r^2}$ near enough as it varies but little for different areas of the same type of column, and this can be

COLUMN LOAD SHEET

Col	Fl.	Tot Live	%	Red Live	Dead Fl	Wall	CM&C	Total	St	L	Section
2	R 12	 13,1			* 29,1 15,1	11,5 18,2	2,0 2,0	42,6	12	9	4-3"x3"x5/16" Ls 10"x5/16" pl.
	11	13,1 13,1	100	13,1	44,2 15,1	29,7 18,2	4,0 2,0	91,0	11	9	4-4"x3"x5/16" Ls 10"x3/8" pl
	10	26,2 13,1	75	19,6	59,3 15,1	47,9 18,2	6,0 2,0	132,8	10	9	
	9	39,3 13,1	60	23,6	74,4 15,1	66,1 18,2	8,0 2,0	172,1	9	9	4-5"x3½"x7/16" Ls 10"x3/8" pl
	8	52,4 13,1	50	26,2	89,5 15,1	84,3 18,2	10,0 2,0	210,0	8	9	
	7	65,5 13,1	45	29,5	104,6 15,1	102,5 18,2	12,0 2,0	248,6	7	9	4-5"x3½"x5/16" Ls 10"x3/8" pl 2-12"x3/8" pls
	6	78,6 13,1	40	31,4	119,7 15,1	120,7 18,2	14,0 2,0	285,8	6	9	
	5	91,7 13,1	40	36,6	134,8 15,1	138,9 18,2	16,0 2,0	326,3	5	9	4-5"x3½"x7/16 Ls 10"x7/16" pl 2-12"x7/16" pls
	4	104,8 13,1	40	41,8	149,9 15,1	157,1 18,2	18,0 2,0	366,8	4	9	
	3	117,9 13,1	40	47,0	165,0 15,1	175,3 17,8	20,0 2,0	407,3	3	9	4-5"x3½"x½" Ls 10"x9/16" pl 2-12"x9/16" pls
	2	131,0 13,1	40	52,3	180,1 15,1	193,1 18,8	22,0 2,0	447,5	2	10	
	1	144,1 22,0	40	57,6	195,2 19,4	211,9	24,0 2,0	488,7	1	16	4-5"x3½x11/16" Ls 10"x11/16" pl 2-12"x11/16" pls
		166,1	40	66,4	214,6	211,9	26,0	518,9	B	9	

* Includes both Live and Dead Loads

Fig. 4

multiplied by the moment in inch-pounds and added to the direct load, giving the numerator of the fraction which is the equivalent direct loading. In some cases it is desirable to use a higher allowable stress for eccentric loading than for direct loading alone. It might be proper to use 16,000 pounds per square inch the same as for the extreme fiber stress in beams. If this were so, we can divide this equivalent direct load by the higher allowable stress, and also divide the direct loading by the usual allowable stress and use the greatest result for the required area. When the designer does not consider it prudent to use a greater allowable stress he may look up the required section directly in the design table (Fig. 5) already used in this article, using the equivalent direct load.

In computing eccentric loads it should be noted that they are not cumulative, one story below another as a rule, as the beams framing into the column at the two floors can form a resisting couple sufficient to take care of the eccentricity above. It should also be noted that even what may appear to be an eccentric load at one floor may be amply resisted by a beam framing into the column at that floor. This moment of resistance is usually equal to the value of the rivets in the top or bottom angles multiplied by the depth of the beam, or in the case of a web connection, to the resistance in tension of the heads of the rivets. As has been already noted, the author prefers a column connection for a beam consisting of a seat and top angle to a web connection, one of the reasons being here apparent that the value of the rivets in shear is more reliable than tension on the heads. Of course the resistance of the angles to bending has to be taken into account as well as the value of the rivets.

Columns for tall buildings are usually made in 2-story lengths, planed at each end. The upper end of each column is placed about 1½ feet above the floor line to allow splice plates to be placed on the flanges of the column below. These extend about 1½ feet above the top of the column, with open holes to be riveted in the field to the column above. For medium sized columns these plates can be made ⅜ inch thick and about 3 feet long, each containing about 8 shop and 8 field rivets. Some designers add a plate on each side of the web with 3 or 4 shop rivets and the same number of field rivets. While this adds to the rigidity of the splice, the author would not consider it necessary unless it were in columns having web plates of great size.

PLATE & ANGLE COLUMNS $16000-70\frac{l}{r}$ Max $\frac{l}{r}=120$

Section				Length in Feet																										
4 Ls		10"x	2 12"x	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
3x3	5/16"	5/16"		141	134	126	119	111	103	96	88	81																		
4"x3"	5/16	5/16			159	153	147	141	135	129	124	118	112	106	100	94	88													
		3/8			167	160	154	148	142	135	129	123	117	110	104	98	91													
5"x3½"	5/16	5/16				185	181	176	171	167	162	157	153	148	143	139	134	129	124	120	115									
	3/8						208	202	195	189	183	177	171	·65	159	152	146	140	134	128	122	116								
		3/8				223	217	210	204	197	191	185	178	172	165	159	152	146	140	133	127	120								
	7/16						243	236	229	222	215	208	201	194	187	180	173	166	159	153	146	139								
		7/16					252	244	237	230	222	215	208	200	193	186	178	171	164	156	149	142								
	1/2						276	268	261	253	245	238	230	222	214	207	199	191	184	176	168	161								
	5/16"	5/16"	5/16"					286	279	272	266	259	252	246	239	233	226	219	213	206	200	193	186	180	173	167	160			
		3/8						294	287	280	273	266	259	252	245	238	231	225	218	211	204	197	190	183	176	169	162			
			3/8					318	310	303	296	288	281	274	266	259	252	245	237	230	223	215	208	201	193	186	179			
	3/8							344	336	328	320	312	304	296	288	280	273	265	257	249	241	233	225	217	210	202	194			
		7/16						350	341	333	325	317	309	301	293	285	277	269	261	252	244	236	228	220	212	204	196			
			7/16					372	363	355	346	338	329	321	312	304	295	287	279	270	262	253	245	236	228	219	211			
	7/16							400	390	381	372	363	354	345	335	326	317	308	299	290	281	271	262	253	244	235	226			
		1/2						405	395	386	377	367	358	349	339	330	321	311	302	293	283	274	265	255	246	237	227			
			1/2					429	419	409	400	390	380	371	361	351	342	332	322	313	303	293	284	274	264	255	245	236		
	1/2							455	444	434	424	414	403	393	383	373	362	352	342	332	321	311	301	291	280	270	260	250		
		9/16						464	453	442	432	421	410	400	389	378	368	357	347	336	325	315	304	293	283	272	262			
			9/16					484	473	462	451	440	429	418	407	396	385	375	364	353	342	331	320	309	298	287	276	266		
	9/16							510	498	487	475	464	452	441	429	418	406	395	383	372	360	349	337	326	314	303	291	280		
		5/8						519	507	495	483	472	460	448	437	425	413	402	390	378	367	355	343	332	320	308	297	285		
			5/8					540	528	516	504	492	480	468	456	444	432	420	408	396	384	372	360	348	336	324	312	301		
	5/8							564	551	539	526	514	501	489	476	464	451	439	426	414	401	389	376	364	351	339	326	314		
		11/16						572	559	546	534	521	509	496	483	471	458	446	433	420	408	395	383	370	357	345	332	320		
			11/16					594	580	567	554	541	528	514	501	488	475	462	449	435	422	409	396	383	369	356	343	330		
	11/16							619	605	591	577	564	550	536	523	509	495	482	468	454	440	427	413	399	386	372	358	345		
		3/4						628	614	600	586	572	558	544	530	516	502	489	475	461	447	433	419	405	391	377	363	350		

Fig. 5

Modern Floor Coverings

PART II

By E. H. HOWARD

IN considering the question of floor coverings it is well to realize fully the tremendous advance made in linoleum and cork carpeting. Some of the English manufacturers, prior to the war, made an inlaid linoleum which was an exceedingly good counterpart of terrazzo. The gloss in the marble chips appeared to advantage, as well as the duller color of the cement. This material was particularly satisfactory where large areas could be covered without the need of any paneling, but there are many instances where this linoleum was used with a panel and border composition which was very effective.

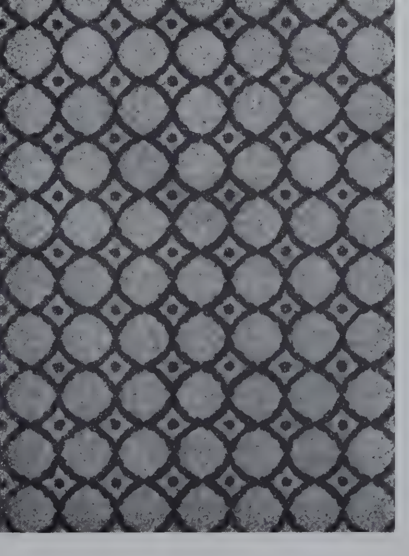
Many times in office buildings and places where the floors receive hard usage, it has developed that the linoleum has had excessive wear in some particular place, for example, before a door. If the linoleum in such a place is a plain color the only method of repair is either to patch the linoleum or to take up a full width and lay a new piece. This necessitates the waste of considerable good material and sometimes it is difficult to get the shade necessary to match the adjoining work. However, if the architect selects a pattern linoleum, it can easily be repaired, if worn, without any great expense.

Another interesting fact regarding linoleum is the statement made by an eminent biologist that it is "bacteria proof"; in fact he maintains that the presence of linseed oil in the linoleum has a distinct tendency towards disinfecting the room in which it is laid. Tests have been made which show that germs cannot live or propagate on linoleum. As a floor covering for hospitals it is exceedingly useful.

There are infinite variety and possibilities in the use of linoleum, and so it is with cork carpeting, which, as has been previously noted, has a much softer surface and texture than linoleum, and it is often used in work of a character different from that to which linoleum is adapted. Cork carpeting, for example, can be used with a large field and with a narrow border around it, such as one frequently finds in two-tone rugs. This gives a pleasing appearance and also satisfactory service.

No consideration of floor covering would be complete without a consideration of cork tile. This is of the same general composition as the "cork carpet" excepting that cork shavings are used and are formed into tiles under high pressure. As a result, the density of the tile is even greater than that of linoleum and still there is no appreciable loss of resilience. This material, in addition to being available in almost any color, shape, size or design, can be used in a wide variety of patterns, making it a material of considerable merit. The tile is impervious to almost any substance except grease, and is readily cleaned. As a floor covering its use is not limited to any certain character of work, but is adapted to almost any situation where a clean, sanitary, noiseless floor is desired. The illustration on the next page shows an effective installation of contrasting colors.

Linoleum and cork carpet have both been frequently used as covering for stair treads and are found very satisfactory for this purpose. Neither material offers a slippery surface under any conditions, and with a metal nosing or a safety tread at the edges the linoleum is protected from wear at its weakest point. Under certain conditions these same materials may be used for the risers as well as for the treads, sometimes improving the appearance.


An Indication of the Range of Patterns Available in Linoleum

Cork Tile Floor in a Boston Tea Room
Blackall, Clapp & Whittemore, Architects

There is a large variety of plain colors as well as the variegated surfaces. The coloring is carried throughout the entire thickness of the material, so that in event of wear the coloring is not destroyed. The characteristics of this type of floor covering are similar in every respect to those of rubber. It is soft and comfortable to walk upon and is noiseless, and like a rubber surface it is hard enough to be impervious to liquids and stains.

In all the types of floor coverings that have been mentioned so far, the maintenance costs are negligible. Damp mopping or wiping up the floor is quite sufficient to restore it to a clean appearance and scrubbing is seldom necessary. Linoleum and carpeting are sometimes stained or painted, but this is not necessary with the rubber or synthetic flooring.

Cork tile seems to be better adapted to special forms of construction than the other carpetings. It may be moulded into special shapes, such as sanitary bases, and in stair construction may form a cove between tread and riser. With this material also a nosing must be used in order to protect the edges from damage. Cork tile requires a slightly different floor preparation from the carpeting. If placed on concrete the surface should be smooth-troweled. If placed on wood there should be a reasonably smooth surface and over this a layer of waterproof paper or felt. It is essential that cork tile be laid under such conditions that it will not be exposed to dampness from below.

As yet nothing has been said relative to rubber tile and similar materials. Rubber tile was originally an interlocking tile type, in which each piece was laid individually on the floor. Now this same composition is put together in sheet form, and can be arranged with border and field as desired. Sometimes burlap is used to hold the material together so it will not be damaged in either transit or laying. It also forms a key between the composition and the floor to which it adheres. Rubber tile has an almost limitless range of color, composition and pattern; it is practically noiseless on the floors and is a soft but durable and almost waterproof medium.

Another type of floor covering is the synthetic rubber, in which a variety of colors may be had. For example, a very good representation of Siena marble, black and gold and gray with a black vein, may be obtained. This is true also with terra cotta, white and black. In appearance this material departs radically from other floor coverings on account of its mottlings, grainings and colorings.

In discussing composition flooring one must always have in mind that some floors have a close similarity to concrete. Still, this analogy is rather remote because the surface is not so hard but still is dustproof and durable and is made of various materials. One of the basic compounds is magnesite, which adds the characteristic of an inert material. It is not susceptible to swelling or shrinking and when once in place is always in place as long as the under material remains unmovable. This material is put down in a plastic mass and can be carried up on the walls to form a dado, base, panels or any pattern.

In preparing the under floor for this sort of work it must be borne in mind that it can be laid on concrete or wood or practically on any surface with the assurance that it will properly adhere. When it is laid on wood a fine mesh wire on expanded metal is tacked down to act as a binder to hold the material together and to the floor. With concrete this is not necessary. In preparing a floor for linoleum or for cork carpeting where concrete is the basis to which the material is to be applied, the concrete should not have a smooth-troweled finish. The floor should be reasonably level and smooth, but if the concrete is a little rough it forms a better key for adhesion. However, when the composition is applied to a wood floor, the floor should be smooth, as otherwise the roughness is likely to show through the linoleum and the wear will be the greatest in the uneven places. With so great a variety of floor coverings available the architect will be able to make a selection which will satisfy every requirement of service and add an appearance of dignity.

MINOR ARCHITECTURE
EXEMPLIFIED IN MODERATE COST BUILDINGS

Small Store and Apartment Groups

FOR various reasons the architectural improvement which is so marked in the designing of the small house, the usual apartment building or the average business structure, does not seem to have been extended to the designing of small store buildings or those structures containing stores and living apartments which are often built in suburban sections or in certain residence quarters in cities. Such commissions are seldom of a size sufficient to make them attractive to architects or to render them the subject of great effort, and in most instances the amounts which the owners are willing to expend are such that only

the barest fundamentals may be had; there is rarely opportunity for the expenditure of more than the amount necessary for securing the minimum of building for which there may be obtained the maximum of return.

In many instances such structures do much to either make or mar their surroundings, and it often happens that the architect into whose office is brought what may at first seem to be a rather forlorn hope is able to point out to the prospective owner certain possibilities which lie within reach, and thus there is brought about an enlargement of the project which may result in its being something more

Chemist's Shop for Coombs Real Estate Trust, Boston, Mass.
Dana Somes, Architect

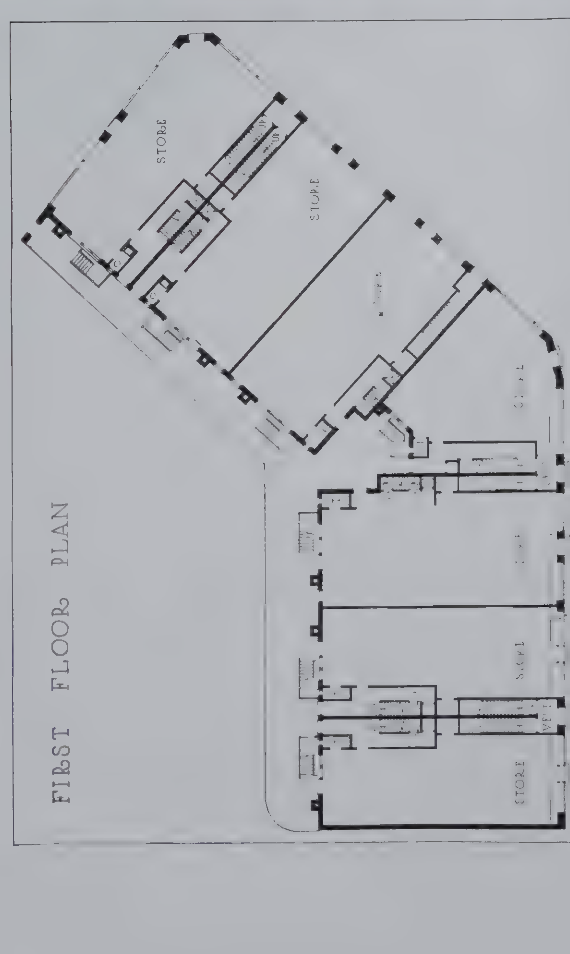
than a dreary combination of utility and ugliness. In almost every village there is a demand for living quarters which may occupy one or two upper floors, or else such floors may be utilized for offices, thus increasing the possible revenue to a point which would warrant the building of a structure vastly different from that which the owner originally had in mind.

Much depends upon the encouragement which the architect holds out and upon the degree of interest which he feels in the undertaking, and consequently in the attention which he gives to the design. That the design counts for much is proved in the case of the small shop building illustrated upon page 65. The structure is but one story in height because of the extremely small depth of the property and the necessity of affording light to the rear windows of apartments built just back of the store and fronting another street. In this instance the owner, with as much enthusiasm and interest as the architect, tried to embody in this modest facade something of the architectural feeling of Beacon Hill, in Boston, at the foot of which it is located, and the financial value of a distinctive exterior was evident in the number of applications for rental long before the building was completed.

The three-story structure illustrated upon this page is on a corner in a New York suburb and the very prominence of its location necessitated a suitably dignified architectural treatment. The lower floor, as will be seen from the plans, is divided into a number of stores which accommodate most of the business activities of the village, while the two floors above contain 14 apartments of six rooms and bath. Each tier of apartments has its own front and service entrances and dumb waiter and the different tiers are separated by brick fire walls.

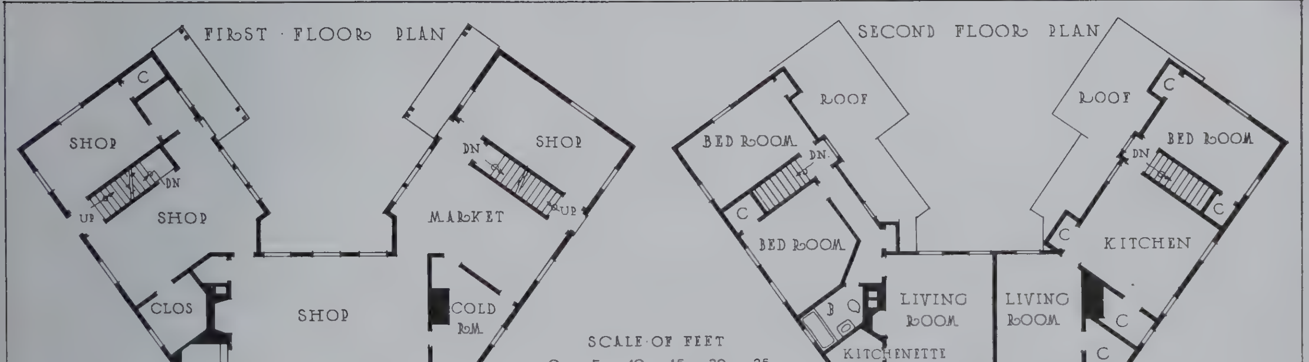
The business and residence structures shown in two other illustrations suggest other variations in the broad range of possibilities which such buildings present and prove anew that these buildings need not necessarily assume the stereotyped appearance which is usually given them. One of the buildings is a detail in a village which has grown up about a large manufacturing plant and is one of a group of structures, designed and planned with more than ordinary care, which serve to house the firm's operatives. Much of the interest of this building lies in the use of the colors—dull blue and burnt orange —which are used for exterior trim and upon the sign board before the "community shops." The other example of the store and residence group illustrates a method of treatment which would be suitable almost anywhere and the plan, which shows well arranged stores and studio apartments with baths and kitchenettes above, may suggest a form for a village development which would be advantageous from an economic standpoint besides forming a decidedly valuable architectural asset to any community in which it might be placed.

Village Stores, Great Neck, Long Island, N. Y.
James W. O'Connor, Architect



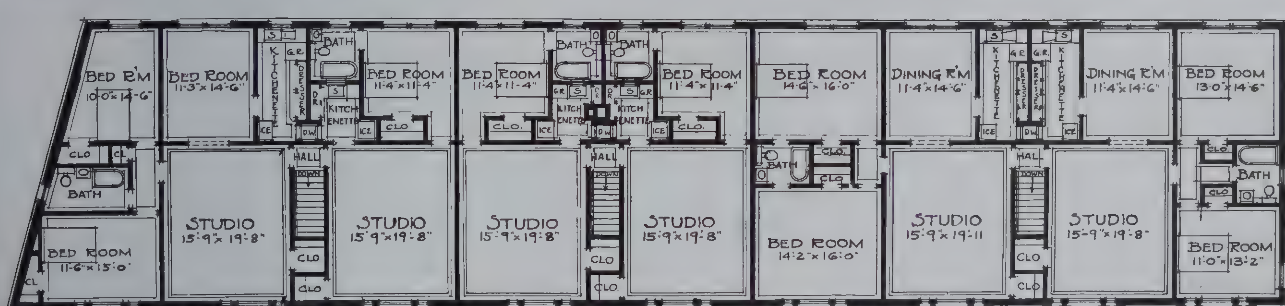
VILLAGE STORES, GREAT NECK, LONG ISLAND, N. Y.

JAMES W. O'CONNOR, ARCHITECT

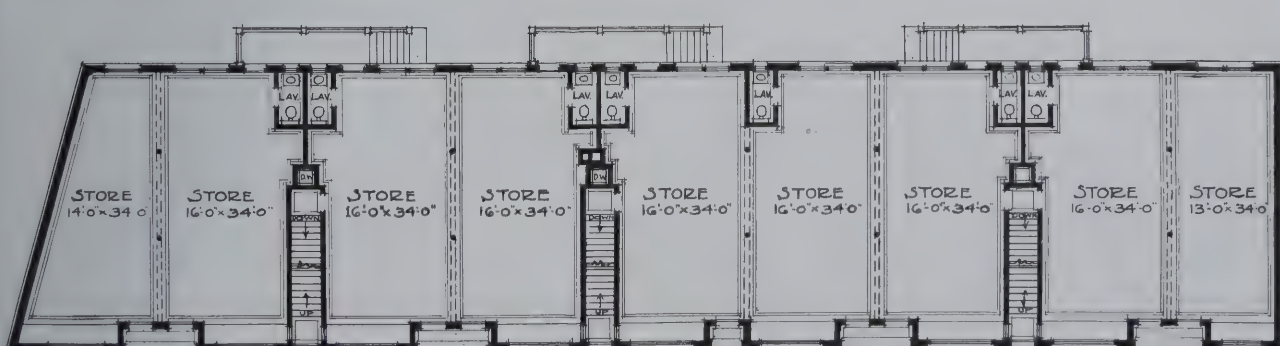


COMMUNITY SHOPS, DANIELSON, CONN.

WILLIAM H. COX, ARCHITECT



÷ SECOND · FLOOR · PLAN ÷



STORES AND STUDIOS, BRONXVILLE, N. Y.

BATES & HOW, ARCHITECTS

HOUSE OF ROBERT MEARS, ESQ., TENAFLY, N. J.

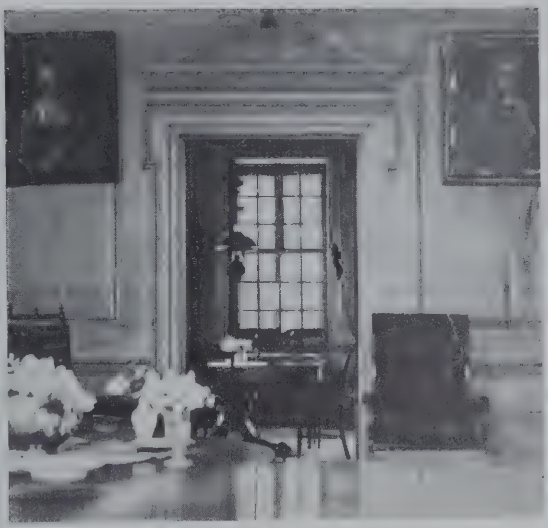
R. C. HUNTER & BRO., ARCHITECTS

Details of Early Southern Architecture

INTERIORS OF SHIRLEY, JAMES RIVER, VIRGINIA

MEASURED DRAWINGS BY GODDARD M. WHITE

THE woodwork of old colonial houses in the south, and particularly the interior trim, is often surprisingly luxurious and of a somewhat heavier and bolder scale than similar woodwork of the corresponding period farther north, where a colder climate necessitated smaller rooms, involving a treatment generally simpler and more restrained. Sometimes, it is true, the southern woodwork exhibits the shortcomings which are apt to accompany the excellent qualities it possesses—an exaggerated scale, or an excess of lavishness of design—but in the main the trim of old houses in Maryland or Virginia affords an excellent basis of study.

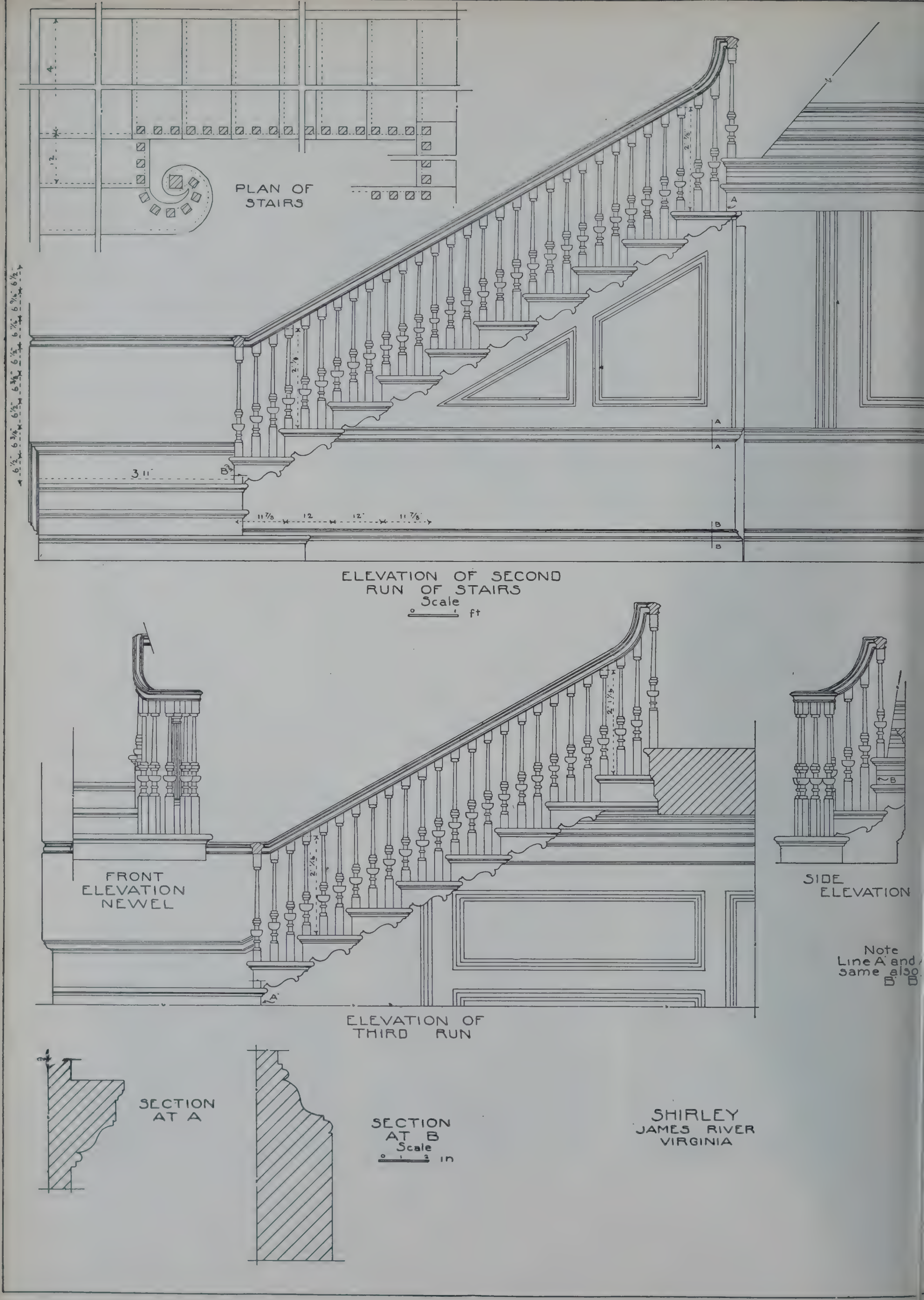


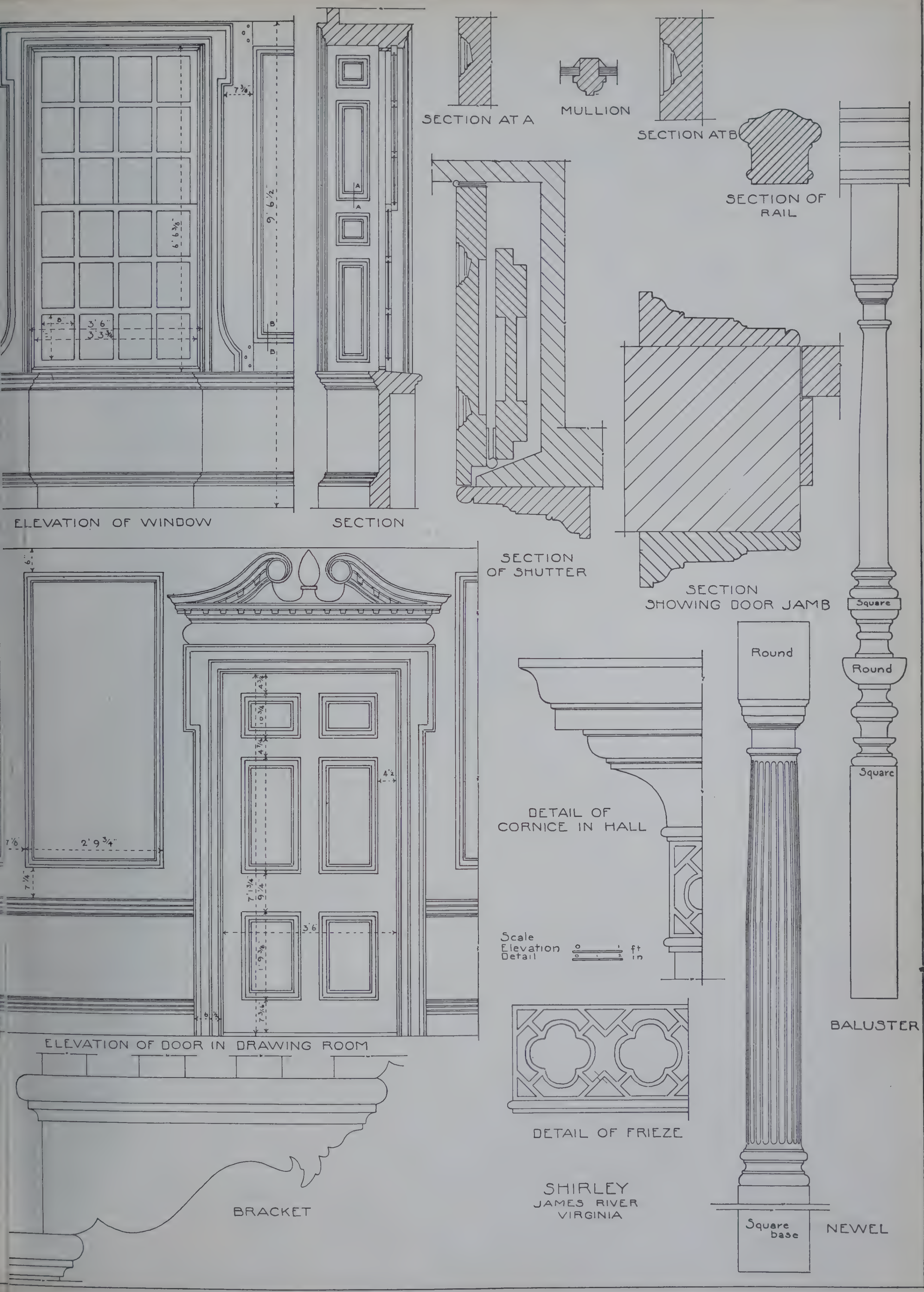
Drawing Room Doorway

Shirley, one of the most famous of the Virginia plantation houses, presents a plan which is unusual in that instead of possessing the customary hall at the center, the hall is placed at one corner of the building and made of considerable size to accommodate the important stairway which is the most striking detail of the building. While the trim of all the most important rooms is comparatively rich and sumptuous, the stairway claims the chief attention of the student, owing partly to the unusual construction of the upper run which is entirely apart from the wall, as may be seen from one of these illustrations, and partly to the interest of its design and the excellence of its proportions. A stairway of the colonial type much over 4 feet wide is not pleasing because the handrail, to appear in proportion, must be impractically high. The eminent English architect, Peter Nicholson (1765-1844), records the fact that a handrail should be 33 inches above the center of the step. The stairs at Shirley are 4 feet wide and the rail is a fraction over 31 inches high, not far from Nicholson's specification and giving excellent proportions. The depth of the tread is 12 inches and height of risers 6½ inches.

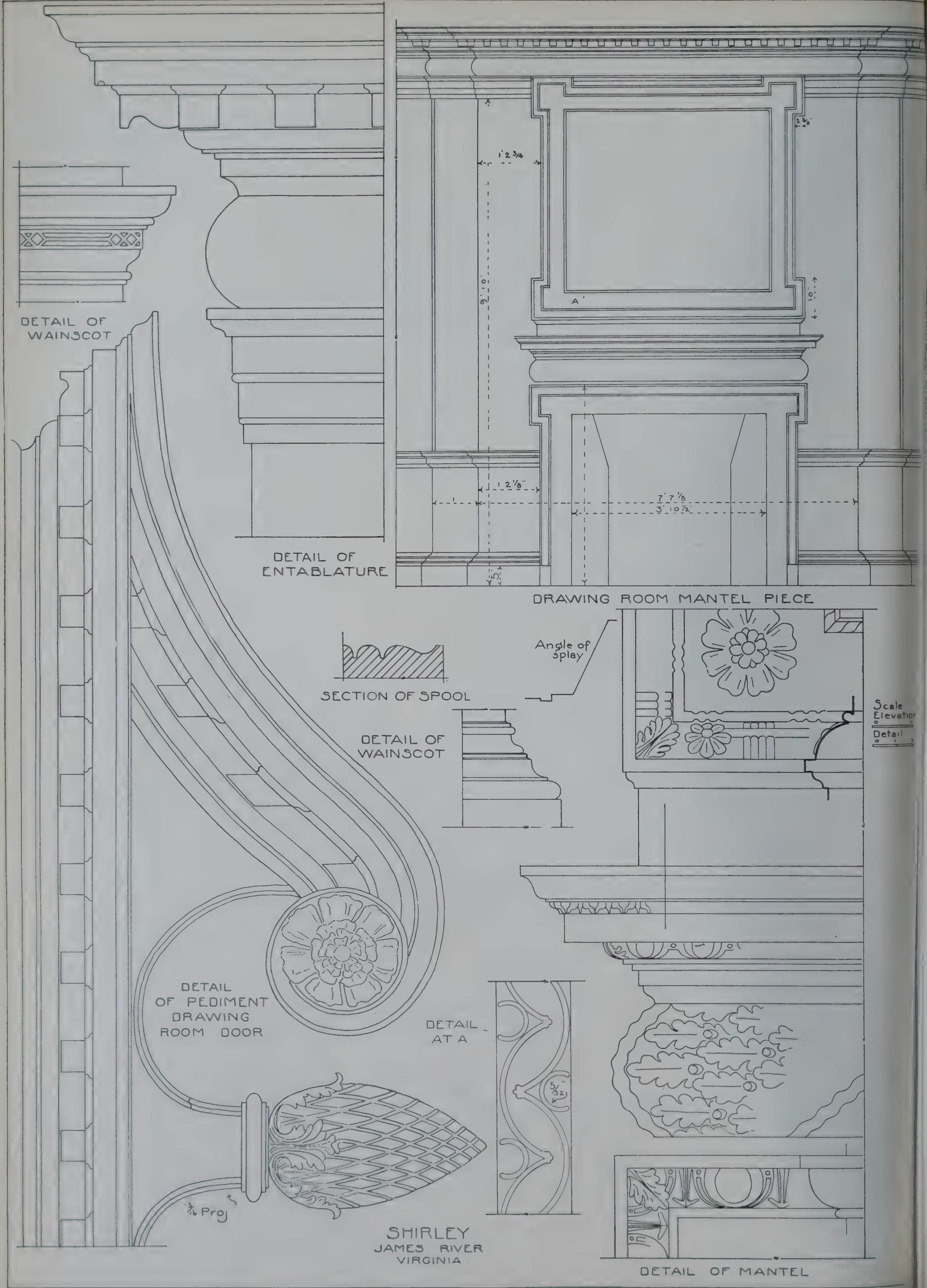
Almost as interesting as the stairway is the drawing room door, of correct proportions, without which the colonial atmosphere is not present.

Details of Stairway and Door at Shirley


PLAN OF STAIRS
ELEVATION OF SECOND RUN OF STAIRS
Scale
ft
FRONT ELEVATION NEWEL
ELEVATION OF THIRD RUN
SIDE ELEVATION
Note
SECTION AT A
SECTION AT B
Scale
in
SHIRLEY
JAMES RIVER
VIRGINIA



ELEVATION OF WINDOW
SECTION
SECTION AT A
MULLION
SECTION AT B
SECTION OF RAIL
SECTION OF SHUTTER
SECTION SHOWING DOOR JAMB
ELEVATION OF DOOR IN DRAWING ROOM
DETAIL OF CORNICE IN HALL
Scale
Elevation
Detail
ft
in
DETAIL OF FRIEZE
BRACKET
Round
Square
Square base
NEWEL
BALUSTER
SHIRLEY
JAMES RIVER
VIRGINIA


DETAIL OF WAINSCOT
DETAIL OF ENTABLATURE
DRAWING ROOM MANTEL PIECE
1' 2 3/4
2 3/4"
9' 0"
10"
A'
1' 2 1/8"
7' 7 1/8
3' 10 1/2"
5"
SECTION OF SPOOL
Angle of splay
DETAIL OF WAINSCOT
Scale
Elevation
Detail
DETAIL OF PEDIMENT DRAWING ROOM DOOR
DETAIL AT A
5/32
3/16 Proj
SHIRLEY
JAMES RIVER
VIRGINIA
DETAIL OF MANTEL

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Quantity Surveying; a Definite Element in Architectural Practice

IN the Service Section of the June issue of THE ARCHITECTURAL FORUM announcement was made of recommendations regarding the use of quantity surveys made by a joint committee consisting of members of The American Institute of Architects, The Associated General Contractors of America and The Engineering Council. Details from a preliminary draft of the report of this committee were given. Briefly, the use of a quantity survey in connection with a building project was highly recommended. It is quite apparent, therefore, that this action will serve to increase the interest in quantity surveying, which has been growing rapidly in this country during the past few years.

Such a survey, in itself, is merely an accurate record of quantities, carefully taken from the plans and specifications on which the contract is to be let. In some instances, where the architect's organization includes men capable of doing this work, a quantity survey may be prepared in the architect's office. As a rule, however, the services of organizations which specialize in quantity surveying are engaged, and payment is made at a cost varying from one-fourth of 1 per cent to 1 per cent of the total estimated cost of the project.

From the report made by the joint committee, already referred to, one section may be quoted: "The cost to owners of preparing bids by existing methods, which make necessary wasteful duplication in estimating quantities by several bidders, is known to be much greater than the cost of preparing bids based on a quantity survey furnished by the owner, and therefore such existing methods are condemned and should be discontinued."

This leads to consideration of the various ways in which the quantity survey may be used by an architect:

1. The survey may be issued to bidders under a general contract and used by them as a check on their own estimates. In this way the architect protects the owner and deals fairly with contractors who are placed in a position to bid without introducing the element of cost where each must take off his own quantities, or the element of risk resulting from an error in figuring quantities — an item for which some allowance is usually made in the contractor's figures. Evidently under this system a closer bid may be obtained.
2. The survey may be kept in the architect's office and used for the purpose of checking up quantities with bidders who may be receiving consideration, before the contract is finally signed.
3. The survey may be made an actual part of the contract in which the contractor bids definitely on the basis of quantities given in the survey.
4. The survey may be made the required uniform basis for all bidders, specifying that the successful bidder will be given opportunity to verify the survey, and that if he proves errors in the survey may revise his bid correspondingly before signing a contract, or within a limited period of time. This method insures that all bidders are figuring on the same basis and makes it possible for them to submit figures more quickly if desired and at less overhead cost since they are not called upon to figure actual quantities on the job until the contract has been awarded.

It is quite evident that usually, when awarding a contract, reliance is placed on comparison of bids taken and of past performances by those contractors who may be under favorable consideration. In many instances these bids do not reflect the true requirements of the work, as various safety elements have been introduced. In many cases, also, bids are made under a loose system of figuring which is largely guesswork on the part of the contractor. In these days when it is so important to be certain of the cost and to develop the lowest possible cost figures compatible with the requirements of the work, the quantity survey offers a method of eliminating waste due to errors in estimating and duplication of effort.

Undoubtedly the average general contractor who has not given careful study to this question of using the quantity survey will be inclined to condemn it. Many contractors in the past have shown that they prefer to gamble on quantities or to trust to a favorable interpretation of plans rather than reduce these elements to a sound, businesslike basis of fact, assuming definite obligations based on definite requirements. Further consideration of the matter, however, seems to have convinced many contractors that operating under a quantity survey is a desirable condition. In this way competition for a contract is made much more businesslike as the foolishly low bidder is eliminated as well as the "safety first" bidder,

who puts in a figure far too high. This leaves an open field for the contractor who seriously wants the contract and is willing to estimate fairly and carefully in order to get it.

The quantity survey has other elements of value from the architect's viewpoint. It can easily be understood that with a quantity survey the preliminary estimates will not be based on excessive quantities. In many instances figures received from contractors have been based on much higher estimates of quantities than have been necessary, in turn affecting the total estimated costs to such an extent that owners have been unwilling to go ahead with the projects. If the figures had been developed correctly, on the basis of the quantity survey, such overestimating of cost would have been eliminated and sound figures presented, which would have proved acceptable from the owners' viewpoint. Again, the quantity survey is of distinct value in checking up the architect's plans and specifications. It constitutes a practical test and service to eliminate any errors in plan or specification. The quantity survey is of particular value where an architect is operating under a separate contract method, as it serves to eliminate all guesswork in the various trades or group of trades to which may be given the separate contracts and separate quantity surveys. This naturally means no overlapping of contracts and no omissions. The architect who has his work laid out in this manner and is possessed of definite quantity figures for his separate contracts is usually in a far better position to execute a building project than the average general contractor whose bid has been based partially on guesswork.

We are told by one quantity surveying organization that on some contracts they have called to the attention of the architects over 100 items that were not definitely covered or which were palpably in error. Instances of this sort have included discrepancies between plan notes and ¾-inch detail, such as a 4-inch slab noted on plan but shown as 5 inches on section. Drawings have been submitted showing walls without foundations. Indefiniteness as to the extent of work of different kinds has raised such questions as where granite stops and limestone begins, the line between marble and tile, and other similar details. In many instances work is specified under several trades which might easily result in several payments being made for the same work. In one case which came to our attention copper louvres were specified under carpentry, sheet metal and miscellaneous items. Again, it was found that a contractor figuring on a plastering contract gave figures from 10 to 15 per cent too high, due to loose averaging methods of estimating. Framing lumber bills have been found as much as 10 per cent too high. On one intricate cut stone contract the architect had been told by prospective contractors that there were 30,000 cubic feet of stone. A carefully prepared survey, however, developed the fact that the work required only a little over 20,000 cubic feet — an excess of 50 per cent.

At a time when it is necessary to get a quick bid on a building project many an architect has found the quantity survey of value, as it served to check up with the bidders rapidly in order to close the contract. In one instance, after the figures in such a survey were turned over to the bidders they in turn went over their quantities and reduced their bids substantially, saving several times the cost of the survey. Another interesting instance was in connection with a large interior trim contract. What looked like a foolishly low bid on this item was investigated and accepted, the architect realizing that the figures of the quantity survey had been made known to the bidder. Ordinarily no assurances on the part of the bidder would have made the architect feel safe in accepting such a figure. He probably would have discarded the bid without considering it, when as a matter of fact, owing to having special stocks of material on hand, the bidder was able to submit an unusually reasonable figure.

These are times when an architect must employ every legitimate means to be certain of the accuracy of estimate and contract figures. In many cases the accurate knowledge developed by the quantity survey may serve as a means to insure the immediate carrying out of a project which otherwise might be postponed. The quantity survey is also a form of insurance which may serve to greatly decrease the chances of receiving bids which are too low for the contractor to carry out successfully. Experience has shown that even though the contractor may be financially able to stand a loss resulting from mistakes in his quantity estimates, he does not do so cheerfully and the consequent delay and dissatisfaction have their direct effect upon the owner's opinion of the services of the architect, even though he is not directly to blame.

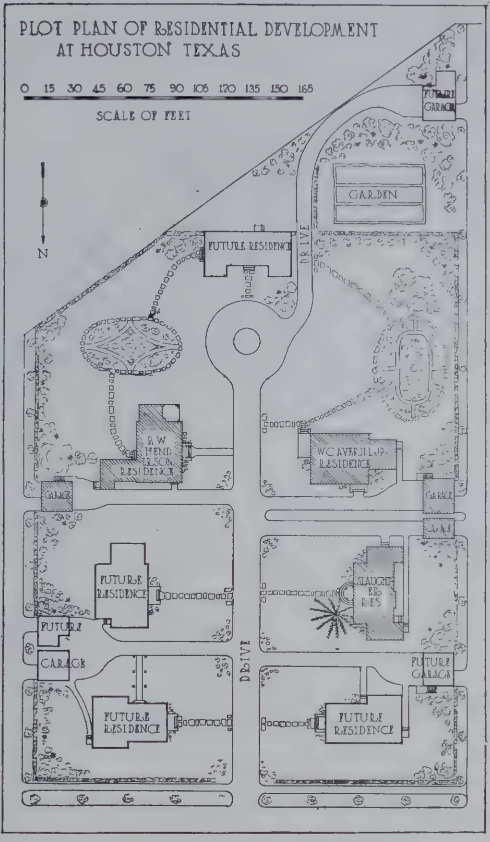
In other recent articles in this section of The Architectural Forum we have from time to time pointed out the advisability of securing a large number of sub-contract figures in order that a greater range of selection of contractors may be available; through this medium it is possible to obtain lower figures than in the case where a limited number of sub-contractors are asked to bid on a contract. This may be greatly expedited by the quantity survey, as ordinarily in many instances sub-contractors will put in bids largely on guesswork, adding a large percentage as a factor of safety. This is often because the sub-contractor is unable or unwilling to figure quantities with care. Naturally, if the quantities are provided for him he is in a position to make a quick and safe estimate which he will be inclined to do under these circumstances. This elimination of the vague "safety" factor in bidding is particularly to be desired.

If information is desired on specific points relative to this subject of quantity surveying the Service Department of The Architectural Forum will be glad to supply the required data.

A Texas Residential Development

J. W. NORTHROP, JR., ARCHITECT

THE residence project which is here described brings out in an interesting manner the point that sometimes there may be co-operation between prospective home builders without developing the property upon what is ordinarily known as a co-operative basis.



Early in 1920, J. W. Northrop, Jr., an architect, of Houston, Texas, suggested to a group of his clients, who wished to build homes at about the same time, that they unite in purchasing an entire city block, approximately 250 x 240. This block was selected by the architect and laid out in accordance with the plan which is illustrated here. The plot of land was divided to accommodate seven dwellings, grouped around a private driveway and developed in such a manner as to form a modern residential unit. It was found that owing to a great increase in automobile traffic the city streets adjoining this property were objectionable because of the noise and dust. For this reason the houses are arranged to back upon the city thoroughfares, and garages and servants' quarters face these streets which are used only for service and deliveries, but owing to the designing of the buildings and the careful placing of the garages this has not resulted in detriment to surrounding property. The method of laying out this space is interesting and attractive. The first result of co-operation on the part of the future home owners was found in the possibility thus provided of taking a large tract of land and arranging it more attractively and conveniently for those who planned their homes here.

The details of arrangement and financing are of interest. There were four clients who were interested in building upon this property. No company was formed to purchase the land, but each of the four furnished one-fourth of the cost of the equity in order to acquire the entire block. The land was then plotted into seven building sites, as shown upon the plot plan. Four of these were selected by the new owners, leaving three sites to be sold ultimately to others who might wish to join the colony. Three individuals who wished to build their homes immediately then paid off their proportions of the blanket mortgage on the land in order to clear their own lots, leaving only a first mortgage on the sites not to be built upon at once. Under the Texas homestead laws it is difficult to obtain building loans, as they are known in the north, and for this reason there was no definite financial problem as the three owners arranged to invest sufficient money to pay for the houses as they developed.

The project of building these three houses was placed entirely in the hands of the architect. Under his supervision separate contracts were let for the

View from Entrance Showing Grouping of Houses

First and Second Floor Plans

House of Dr. J. W. Slaughter, Houston, Texas

development of the land, including grading, curbs and gutters, and the necessary extension of sewer and water lines to the building sites. A central concrete drive and driveway returns were laid and brick and stone piers were erected at the entrance to the block. The cost of these improvements was divided pro rata among the seven building sites into which the original block was divided. Separate plans and specifications were made for each of the three houses erected, and competitive bids were taken on each so that a separate contract was let to the lowest reliable bidder for each house.

It was found that the method as thus outlined gave each owner complete freedom in developing his own residential property. There were placed necessary restrictions on the building sites which served to secure for each a maximum supply of light and air and lawn space and which guaranteed to the group of home owners a further growth quite different from that of the average speculative development in which buildings are placed too closely together or designed so that there is no unity of mass. It is interesting to note, from the financial viewpoint, that after the block improvements were made and all costs had been charged against each building site, it was found that the cost (approximately 40 cents per cubic foot) was about one-fifth less than the asking price of similar improved adjoining property. It would seem that the business details of this transaction were handled in an excellent man-

House of P. B. Miller, Esq., Houston, Texas

J. W. Northrop, Jr., Architect

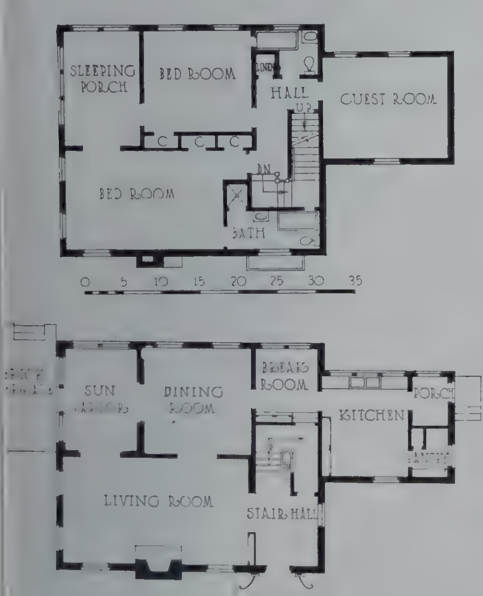
First and Second Floor Plans

ner by the architect, who conceived the plan, selected the land, and finally sold the idea to a group of prospective clients. Undoubtedly there has been a considerable saving upon all the details of this operation and the cost to the original owners will be reduced by the selling of the plots not already built upon.

Architecturally these dwellings indicate definitely the increasing interest in colonial design in residential construction and its constantly widening influence. The value of simple lines, studied mass effects and arrangement of exterior openings is always definite where such designs are carefully developed by the architect. In this instance the architect's problem was complicated by climatic conditions—in fact this operation probably represents one of very few successful attempts to adapt early American architecture to the peculiar climatic conditions of this section of the country, where a room not exposed to the prevailing southeast breeze is of little practical use in summer. It was necessary, therefore, to employ larger and more numerous exterior openings than would be necessary in buildings in the north and east. Careful provision also must be made to secure cross drafts. There were details of planning employed by the architect to solve exposure and air circulation problems, as will be noted in the floor diagrams, such as the provision of smaller or ell-shaped wings, together with careful orientation. For the exteriors of these houses a local rough surfaced face brick was employed, using shades of red and gray laid with light gray mortar, the joints being flush with the face of the brick. For one of the houses a deep red face brick of very rough texture laid in white mortar was used. Roofs are of green slate or of cedar shingles stained a soft gray-green. Three-coat plaster on metal lath was used for the inner walls throughout; rough sand finish was employed and a final coat was tinted by

Detail of Entrance to Henderson House

using a small amount of mineral pigment which provided finishes in gray and tan without the use of paint. A complete electrical installation in each of the three houses includes electrical heating, water heating system and electrical kitchen range. Another house under construction has an interior finish with canvas and paper on shiplap. The roof is of green slate shingles, and gas is used for range and automatic water heater. A hot water heating system is provided in this house. The costs of these houses averaged from 46 to 52 cents per cubic foot, varying according to specifications.



First and Second Floor Plans

House of W. C. Averill, Jr., Houston, Texas

J. W. Northrop, Jr., Architect

EDITORIAL COMMENT

WHAT OF THE INDIVIDUAL ARCHITECT?

ONE of the outstanding developments in the economic progress of the past few years is the movement toward co-operative effort. This has already attained such proportions in the business world that it has changed entirely some of the basic principles of business. Whole groups of producers, distributors and even retail dealers are associated for greater economic advantage; information of various kinds is freely exchanged among the members, on the theory that the ultimate benefit to the groups and to the individuals comprising them will result in putting the smaller elements in possession of the experience and knowledge of the larger and more powerful. Business has prospered under these new conditions, and it would naturally follow that associated effort is largely responsible. That there are dangers in such a course is obvious. Investigations in the field of building material supply alone have uncovered the ease with which the power offered by such combinations can be applied to selfish advantage through the elimination of competition, curtailment of production and other means designed to increase profits.

The architectural profession is not without a share in this modern tendency, and since several instances in various sections of the country have appeared it may be worth while to analyze their possible effect on the practice of architecture and the promotion of the art. The most recent activity of this nature to come to our attention is the Allied Architects' Association of Los Angeles. This Association was organized in the first week of July, 1921, with the purpose of providing the municipal, county, state and national governments with the group services of a number of architects in the designing of public buildings. It is the theory of this Association that its members can submerge their individual interests and collectively offer the civil authorities an opportunity of securing the highest quality of architecture in public buildings and at no greater cost than would be incurred in the employment of an individual architect. The Association is prepared to design and execute work of a public nature and will maintain the necessary offices and organization, entirely apart from the offices of its members and from their practice as individuals.

Upon an examination of the plan, from such reports as have reached us, it seems only fair to say that while the excellent intentions of the proponents of the idea are entirely praiseworthy, it is difficult to see in its operation—even under the most favorable conditions—any reasonable basis for hope for either a higher development of architecture or better service to the various forms of civil government to which the services of the Association are offered. Architecture is one of the most individualistic of the arts and it is hard to understand how it could be successfully carried on by following the "merger" methods which might be entirely successful in many forms of commercial effort. One could name scarcely a single example of highly successful architecture which is not the visible, tangible expression of the genius and daring of some individual architect, or which could have assumed its present form if worked out under a plan which would divide the responsibility among 30 or more. It would be quite as reasonable to expect a masterpiece of painting or sculpture from an effort in which a score or more artists were called into co-operation, each to have a voice in the determination of the result; the outcome would probably be a compromise, which would not represent the ideas or personality of a single individual.

There are other reasons why the plan, as we understand it, seems to be an unwise venture; among them might be mentioned its effect upon architects as a body—excepting those belonging to the Association—and upon the public at large. Discouraging indeed to the rank and file of the architectural profession must be a gathering into an exclusive body of many of the leading architects of any locality, which might well attract to itself any national, state or municipal commissions available, to the total exclusion of architects outside the body. There has been considerable expression among architects of a desire to claim a position in the community which would be a logical and fitting expression of the importance of the profession. This position, we feel, is amply deserved and if seriously and confidently claimed it will be readily conceded, but we doubt very much if the profession's claims, in the eye of the public, will be greatly strengthened by any such association of effort as is here put forth. The general public has formed its idea of what architecture stands for and this opinion will only be weakened and confused by any unwise move which would render vague or obscure its functions as generally understood.

Not that we undervalue or deprecate any form of practical co-operation. We are convinced more and more that this is the time when co-operation in every worthy form should be encouraged, employed and emphasized; nevertheless, we feel that there are some departments of effort, such as architecture, in which co-operation in unusual forms is hardly practicable, and among these forms, we fear, must be classed the effort which has been considered here.

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

WARREN WEBSTER & COMPANY, CAMDEN, N. J. Catalogue bulletins (8½ x 11 ins.). 124 pp.

These pages on heating and heating appliances contain the combined contents of eight bulletins in a substantial binder. The specialties of this company in subject and bulletin number are:—Feed-Water Heaters—General (100–1); Feed-Water Heaters (102); Heater Meter (200); Steam Separators (301); Oil Separators (401); Sylphon Trap (701); Modulation Valve (705–1); Sylphon Attachments (851); Expansion Joints (1100), and Vacuum System of Steam Heating (B–500). The illustrative mechanical sections and diagrams show the function of the various products and detailed directions for specifying and installing are given in each bulletin, with dimensions. To those who are engaged in the designing of heating plants or their component parts, the views of existing work will be of interest. Many helpful suggestions are made for installation and the engineering staff of the company offers co-operation in work of a complicated nature.

AMERICAN VENTILATING CO., PITTSBURGH, PA. "American-Larson Suction Ventilators" (8 x 11 ins.). 24 pp.

A description of results obtainable with properly designed ventilators is given in this book on the pivoted, suction type of cowl for continuous duty. With efficiency based on a five-mile breeze and the rated capacity of certain models, a definite number of air changes per hour can be arrived at. Practical information on the requirements of industrial, civic and residential buildings is here given for determining necessary ventilating heads. Many instances of work accomplished by siphon ventilators made by this company are described, and points to remember in providing for the removal of objectionable gases or the tempering of atmosphere will be found.

AMERICAN DISTRICT STEAM COMPANY, NORTH TONAWANDA, N. Y. "The Adsco System of Atmospheric Steam Heating" (6 x 9 ins.). 32 pp.

This small book has to do with the devices used on a low pressure heating system, whether the steam is supplied from central stations or individual boilers. Special reducing valves, boiler dampers and radiator control valves are introduced for use where steam pressure only amounts to about eight ounces as the maximum. This is primarily the well known vapor system of heating. Items for estimating the capacity of the average layout are given and typical buildings with this system are shown.

ANNOUNCEMENTS

Charles Frederick Cellarius announces the opening of an office at 401 St. Paul Bldg., Cincinnati, for the practice of architecture.

Hamilton Harlow announces his withdrawal from the firm of Dow, Harlow & Kimball, architects and engineers. He will continue the practice of architecture under the name of Hamilton Harlow, Architect, with offices at 1388 Massachusetts avenue, Cambridge, Mass. Manufacturers' samples and catalogs are requested.

Kniffin & Thornhill, architects, engineers, contractors and manufacturers' agents, Chihuahua, Mexico, are now located at 518 Calle Aldama, P. O. Box 97. Manufacturers' samples and catalogs are desired.

Ralph J. Batchelder and Walter H. Scales announce the formation of the firm of Batchelder & Scales for the general practice of architecture and structural engineering, with temporary offices at 35 West 27th street, Indianapolis. Manufacturers' samples and catalogs are requested.

Frank H. Quimby, architect, announces the removal of his office to 110 William street, New York.

Alfred H. Wheeler, architect, announces his removal from the Globe Bldg. to 407 Metropolitan Bank Bldg. 5th and Cedar streets, St. Paul.

Harold P. Bergen announces the opening of an office at 607 Worcester Bldg., Portland, Oregon, for the practice of architecture.

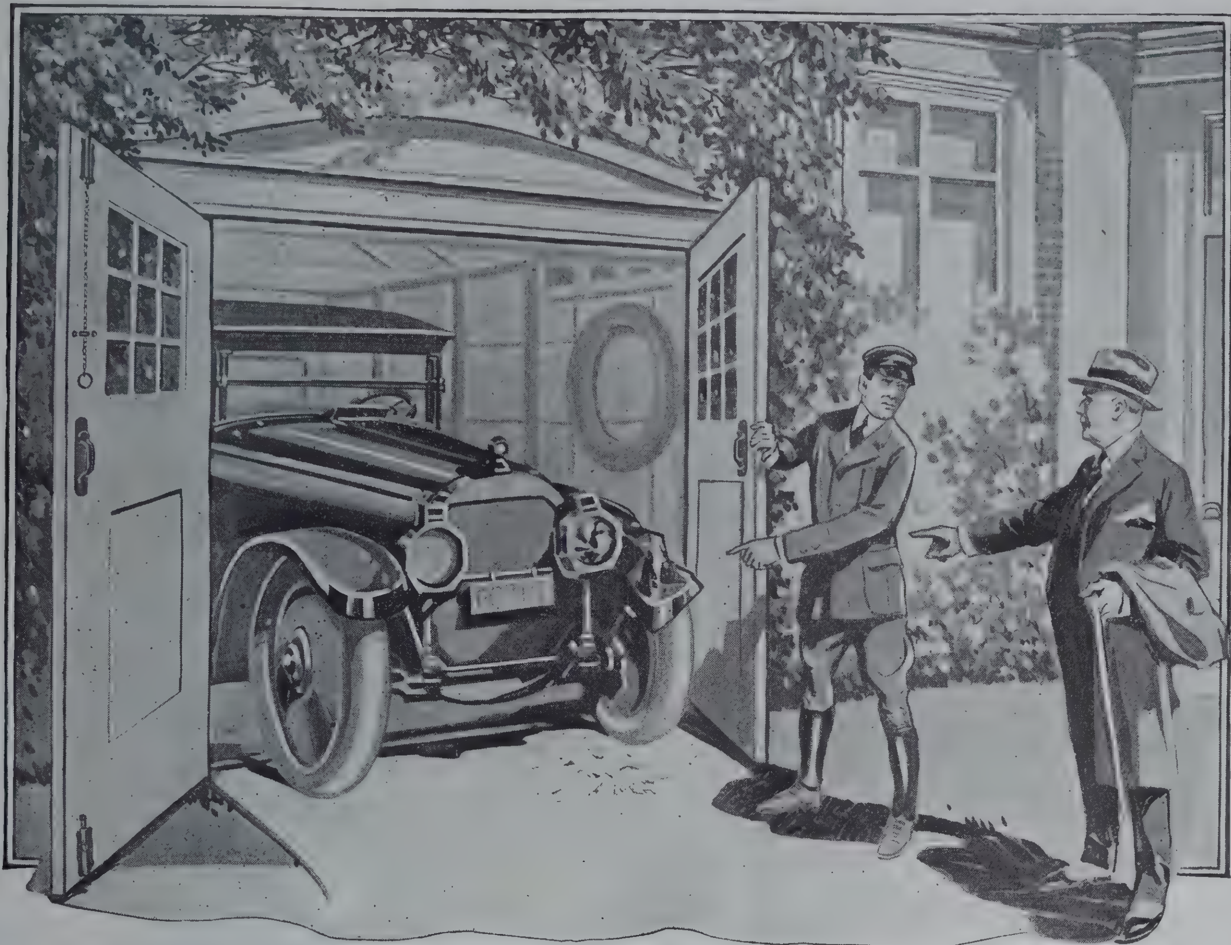
R. G. Eliel announces that the firm of Wolfley & Eliel has been dissolved, Mr. Wolfley having withdrawn. The new firm will be known as Eliel & Eliel and will continue the practice of architecture at the old address, 610 Stewart Bldg., Rockford, Ill.

William Albert Swasey announces the removal of his offices to the Gotham Bank Bldg., Columbus circle, New York.

COMPETITION IN GARDEN DESIGN

THREE PRIZES—$150, $100, $75

THE Society of Little Gardens, wishing to promote interest in the art of the small garden, announces a competition for the design of a garden treatment of the typical suburban back yard. This competition is directed and will be adjudged by a committee composed of Wilson Eyre, Jr., Warren P. Laird and Horace Wells Sellers, under a program approved by The American Institute of Architects. Drawings are due October 15, 1921. Information may be had on application to Mrs. Charles Davis Clark, 2215 Spruce street, Philadelphia.



New Home of S. W. Straus & Co., 5th Avenue and 46th St., New York

FRINK

IN THE

UP-TOWN FINANCIAL DISTRICT

The patrons of an institution are usually a testimonial to its character and service, and its best advertisement.

Guaranty Trust Co.	Metropolitan Trust Co.
Bankers Trust Co.	Equitable Trust Company
National City Bank	Bank of America
Central Union Trust Co.	Columbia Trust Co.
S. W. Straus & Co.	Lincoln Trust Company

Screen Reflectors
Desk Reflectors
Upward Diffusers
Polaralite Signs

Architects are invited to make use of our Engineering Department in any lighting installations contemplated.
Write for special Bank Catalog.

I. P. FRINK, Inc.

24th Street and 10th Avenue, New York
Wrigley Bldg., Chicago 77 O'Farrell St., San Francisco

A Third of a Century

That's our record. We are passing our thirty-third milestone of manufacturing Caldwell Sash Balances. A record we are proud of. Our Sash Balance are still giving service where installed over thirty years ago.

QUALITY PROVEN is assurance

that you can safely specify

CALDWELL SASH BALANCES

The overhead Balance permits the use of narrow mullions. We are better equipped than ever to render dependable service. Write for Catalogue, "Suggestions For The Present Day Architect."

Caldwell Mfg. Co., File S, Rochester, N. Y.

SASH CHAIN

BLACKSTONE HOTEL
Michigan Ave., Chicago, Ill.
Marshall & Fox, Architects

Situated on Michigan Ave., Chicago, Ill., is the Blackstone Hotel, well known for its accommodations and service of the highest class. Smith & Egge Sash Chain was used to hang the windows of this hotel and since its installation this chain is daily giving the same high-class service and satisfaction as the Blackstone Hotel is giving to its patrons.

Our Sash Chains are made in "Giant Metal" and "Red Metal" from special bronze mixtures controlled by us, and in Steel from the best cold rolled steel obtainable.

See page 943, Sweet's Catalog

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

ORIGINATORS OF SASH CHAINS

THE ARCHITECTURAL FORUM

SEPTEMBER
1921

Single Copy Sixty Cents ROGERS AND MANSON CO., PUBLISHERS Six Dollars the Year

THE ARCHITECTURAL FORUM

VOLUME XXXV NUMBER 3

CONTENTS for SEPTEMBER 1921

PLATE ILLUSTRATIONS

LETTERPRESS

ALBERT J. MacDONALD, Editor

Published Monthly by

ROGERS AND MANSON COMPANY

142 Berkeley Street, Boston 17, Mass.

Advertising Department, 103 Park Avenue, New York

Yearly Subscription, payable in advance, U.S.A., Insular Possessions and Cuba, $6.00

Canada .... $6.75 Foreign Countries in the Postal Union, 7.50

Single Copies .... 60 cents All Copies Mailed Flat

Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.

Albert J. MacDonald, Pres. and Treas., S. Howard Myers, Vice-Pres., Robert Sweet, Sec.

THE EDITOR'S FORUM

LABOR'S PART IN BUILDING

WHAT amounts to an Emancipation Proclamation has been issued for the building industry of Chicago against the tyranny which has for years been maintained by organized labor. On September 7, Judge K. M. Landis, acting as arbiter between the Chicago Building Trades Council on the one hand and the Building Construction Employers Association and the Associated Builders upon the other, handed down a momentous decision, reducing the wages of skilled and unskilled labor in the building trades and promulgating new rules and conditions which will aid in restoring this industry to the sound basis upon which it normally rests. The decision was rendered after weeks of idleness, and its provisions are to remain in effect until May 31, 1922.

Among the terms of the decree, which is destined to hasten the recovery of an industry held almost paralyzed by unreasonable demands, are several important items; the owner, who pays the bills, is at last allowed to have a representative upon his own work, and an employer may use non-union labor when the supply of union workers is inadequate. Substantial reductions in wage rates cut the cost of building fully 20 per cent, and absurd and puerile "rulings," designed to make a work last as long a time as possible—with profit to labor—are completely discarded, together with artificial provisions which necessitate the employment of representatives of many different trades for the performance of even the simplest work.

While THE ARCHITECTURAL FORUM entertains no prejudice against organized labor, as such, and would gladly further its legitimate aims, its editors have for years viewed with growing dismay the increasing truculence and the unfair attitude which have long characterized labor's relations to the public, and particularly to the building public. Labor's leaders, with a sinister callousness, availed themselves of the disorganized condition into which the country was thrown by the war to present a bewildering list of petty demands and troublesome regulations which need not be tabulated here. Labor's attitude and disregard of the public welfare have hitherto completely frustrated all efforts toward a resuming of building upon a scale which would even begin to meet the demand for shelter, caused by the all but complete cessation of building during the war.

Judge Landis' decision, affecting as it does merely the Chicago district, may well be followed by results which are far reaching. The vice-president of one of the largest building construction companies in the United States considers this the most significant action which has been taken toward stabilizing building conditions. Even though a condition to Judge Landis' serving as arbiter was that his decision would be accepted by labor, it is quite within the realm of possibility that certain unions will refuse to abide by the decision, but labor would be badly advised did it decline to be governed by the terms of the ruling, for such a course would but serve to increase its unpopularity with a public already ruthlessly bled by its demands and exactions. Only by respect for the decision and by earnest effort to repair the injury which it has already inflicted upon the public, can labor hope to regain the sympathy and favor it once enjoyed.

BOOK NOTES

THE AMERICAN HOSPITAL OF THE TWENTIETH CENTURY. By Edward F. Stevens, Architect. Architectural Record Co., New York. Octavo, 380 pp., 480 illustrations and plans. Price, $7.50 net.

THE rapid growth in the development of hospital building which has been evident during the past few years makes possible considerable data which is of interest to architects, particularly when recorded by an architect who has achieved unusual success in the designing of hospitals of various kinds. Originally published in 1918, this volume quickly became an authority on the subject of hospital planning and designing and the first edition was sold out in about two years.

In 19 chapters the subject of the modern hospital is given careful study, and conclusions arrived at are illustrated by reference to a large number of well known hospitals in different parts of this country and abroad. It is a book which gives an exhaustive treatment of a subject of high importance to the architectural profession as well as to the medical world.

THE ART OF STAINED GLASS. By Walter F. Wheeler, with a foreword by Ralph Adams Cram. Published for distribution among architects by Henry Wynd Young, worker in glass, mosaic and church decoration, 314 East 34th street, New York.

THIS venerable and useful craft, which saw its most brilliant period of development during the mediæval period, is now apparently entering its second spring. The general turning to the arts of the past, which is one of the most encouraging signs of the times, has produced workers in many of these arts who in skill of design and dexterity of workmanship are rivaling the masters of earlier centuries. In no one of these crafts has the raising of the standard of public taste been more marked than in that of stained or painted glass, the improvement being due largely to the excellent work of a few men in America and England who have learned some secrets of mediæval workers.

The brochure, which reviews briefly the possibilities of stained glass and illustrates certain of its modern uses, is preceded by a foreword by Ralph Adams Cram, himself an earnest student of Gothic architecture and the various arts which united to produce the culmination of its splendor.

WOLFF MANUFACTURING CO.
TRADE MARK
CHICAGO

WOLFF

Sanitary Enamelware . Range Boilers
Potteryware . Brass Goods . Marble

A Complete Line made in our own plant and thoroughly standardized

To the Plumber, WOLFF signifies ease of installation, accuracy in service and hearty trade co-operation—*to the Architect and Owner,* thoroughness in construction and satisfaction in use.

WOLFF MANUFACTURING CO.
Established 1855

Dallas CHICAGO Denver
Omaha St. Louis Hammond Cincinnati

FIREPLACE IN THE DAVANZATI PALACE, FLORENCE

The
ARCHITECTURAL
FORUM

VOLUME XXXV SEPTEMBER 1921 NUMBER 3

First American Flag on French Front

CARRIED BY AMERICAN ARCHITECTURAL STUDENTS

IN the turbulent days of August, 1914, among those leaving Paris to enter training and prepare to go to the front, was a group of American students who had been studying architecture at L'Ecole des Beaux Arts. Forced by their devotion to Liberty and to France, these men had enlisted in the Second Division of the Foreign Legion and as they marched through the streets of Paris above their heads floated an American flag which had been presented to them by a group of American women. They carried this flag with them to their first camp in Rouen and, when Rouen was menaced by the enemy, on to Toulouse. Returning from Toulouse to Paris on their way to the front they spread their flag on the side of the cattle car which carried them. After arriving at the front they were not allowed to display the flag of a neutral country but they always honored it and protected it and when they went over the top some one of them always carried it wrapped around his body.

Finally the time came when the United States took its place in the war. The little group of American volunteers was scattered; three were dead, one seriously wounded, one a prisoner in Germany. One of the survivors sent the flag to the Rector of the American Church in Paris, calling upon him to offer it to the French government as the first American flag on the French front.

The day for the presentation of the flag was set for the Fourth of July, 1917. The first detachment of American troops to arrive in Paris took part in the ceremony which occurred in the Cour d'Honneur de l'Hotel des Invalides. The day was cloudy and delightfully cool. The balconies were filled and the walls of the old building, which had already seen so many glorious spectacles, formed a remarkable background. All was arranged by the Military Governor of Paris and his staff, with perfect taste. In the center of the court stood the French President, the Minister of War, Marshal Joffre and other well known Frenchmen, surrounding the American Ambassador and General Pershing. Before them were ranged three groups of flag bearers. The American band played, followed by the French band. Then the American troops advanced, marching with their swaggering, rolling gait, a little like that of a sailor. They were spick and span and evidently husky.

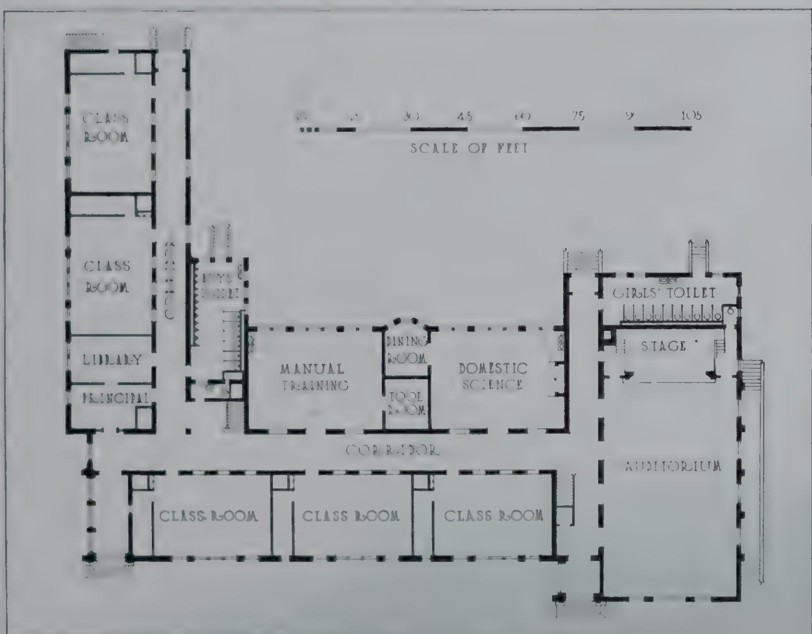
Then came the old territorials, muddy, in their faded uniforms. How dear they were to the Parisians, Frenchmen and foreigners, and how these old poilus were applauded, and how proud Paris was of them when they took their place, marching with the same quick, confident step they had in August, 1914! The American band played the "Marseillaise." The French band played the "Star Spangled Banner." Then General Pershing was presented with a girdon by the descendants of the soldiers who fought with Washington and Lafayette in the American revolution, and also with a banner made by the women of Puy.

Then came the moment for honoring these men of the Foreign Legion. The great American army had taken their place. The pioneers of Liberty could retire. The Rector of the American Church in Paris came forward, accompanied by Charles Carroll carrying the flag. The Rector spoke first to General Pershing, saying that this flag was being proudly given to the French by the men who were the pioneers of the American forces, now that it would be replaced by the new banner of his army. He confided to the General the finishing of the task so bravely started. Then the Rector turned to the noble veteran, General Niox, and presented the flag, saying that it was the prophet of the coming of America to the place where she was in spirit from the first.

In the heart of Paris, which is the heart of France, rests the first American flag which was carried on the French front in the great war. It is surrounded, protected by stone walls, stones unconscious of this honor—but the memory of those who carried this flag where it received its first baptism of blood, will be guarded in the hearts of us all, American and French, and will remain forever.

For these notes we are indebted to Rev. Dr. S. N. Watson, Rector of the American Church in Paris for ten years, including the period of the war. Dr. Watson was in charge of the commission organized by the French government in behalf of the orphaned children of France and was made a Chevalier of the Legion of Honor at the close of the war.—*The Editor.*

VIEW OF AUDITORIUM WING



FIRST FLOOR PLAN

TOWER AND LOGGIA ENTRANCE

LA VILLA SCHOOL, JACKSONVILLE, FLORIDA

MARK & SHEFTALL, ARCHITECTS; WILLIAM B. ITTNER, CONSULTING ARCHITECT

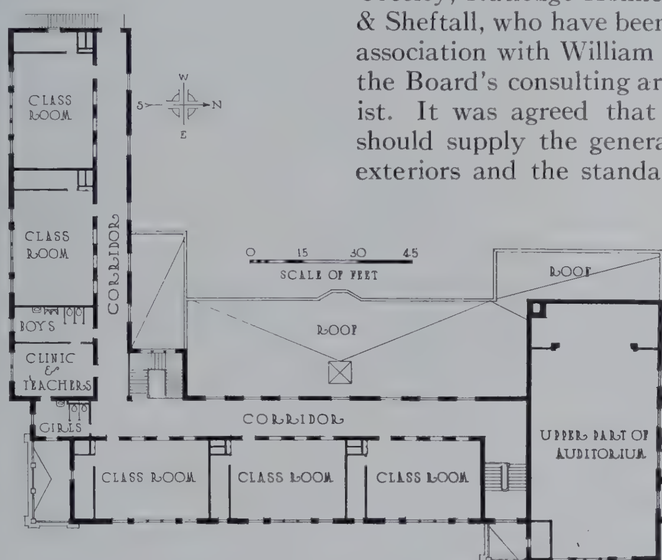
Some Recent Florida Schools

THE WORK OF WILLIAM B. ITTNER, CONSULTANT, AND COLLABORATING ARCHITECTS

THE building of schools throughout the country is a subject of importance today to local governing bodies. Not only is there an acute shortage of buildings because of the period of non-building during and since the war, but because the standards of public education have been so greatly raised and new subjects added to curricula there are countless schools that are now inadequate and must be replaced. We thus see large building programs being undertaken involving the construction of several schools in a community at one time. The design of schools has become largely a specialty with a number of architects, and it is becoming increasingly frequent to effect a working arrangement for the execution of a school program between local architects and a school specialist as consulting architect. The schools illustrated in these pages have been designed under such an arrangement and show eminently practical results.

Early in 1915 Duval County, Florida, voted $1,000,000 for the construction of a number of school buildings. The building program, as determined by the Superintendent of Schools, included the erection of 14 small schools in various parts of the county, varying in sizes from 2 to 4 rooms, while in Jacksonville, besides additions to four existing schools, there were to be four 8-room buildings and three schools having 12, 16 and 18 rooms respectively. Fully realizing the importance of securing economical construction and the utmost in architectural and practical value which could be had, the School Board selected a number of architects in Jacksonville, R. A. Benjamin, Mellon C. Greeley, Rutledge Holmes, H. J. Klutho and Mark & Sheftall, who have been in charge of the work in association with William B. Ittner of St. Louis as the Board's consulting architect and school specialist. It was agreed that the consulting architect should supply the general data for the plans and exteriors and the standardization of construction, finish, heating, ventilating and sanitation of the different buildings, the actual plans and supervision being supplied by the Jacksonville architects.

As a guiding principle it was agreed that all the school buildings, large or small, should be planned with a view to easy and logical en-



Second Floor Plan, La Villa School


General View of La Villa School, Jacksonville, Florida

Mark & Sheftall, Architects; William B. Ittner, Consulting Architect

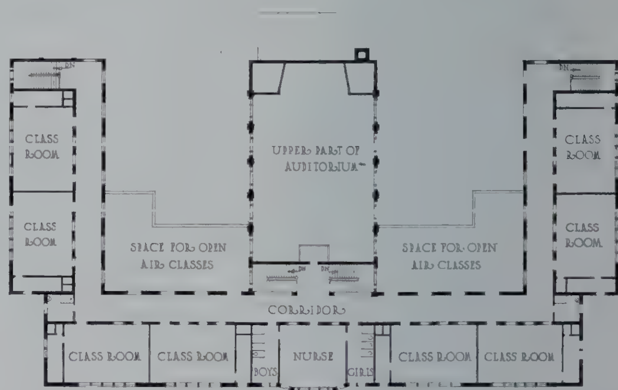
largement, and in view of climatic conditions it was thought best that an open plan be adopted and that classrooms be placed upon but one side of a corridor. It was found to be advisable that the smaller schools be developed as one-story structures and that larger schools be limited in height to two stories with the lower floors, under normal site conditions, raised from 3 to 4 feet above grade to insure dryness and to provide sufficient room for steam mains, ducts, etc. In order that due economy of cubic space be observed it was decided that the width of both main and side corridors be established at 10 feet and that classrooms be planned for a maximum of 40 pupils, the size being uniformly 22 x 32 with wardrobe spaces 5 feet 6 inches in width. Lighting and ventilation for classrooms were provided by windows placed upon only the long axes of rooms, with smaller windows for ventilation in the inner walls above the blackboards; outside light was recommended, wherever possible, for the wardrobe spaces.

A school building having 8 rooms or more was planned to include, in addition to the classrooms:

- Principal's office.
- Teachers' rest and work rooms.
- Assembly room.
- Domestic science laboratory.
- Wood working shop.
- School library.
- General and private toilet rooms.
- General storeroom.
- Space for heating and mechanical plant.

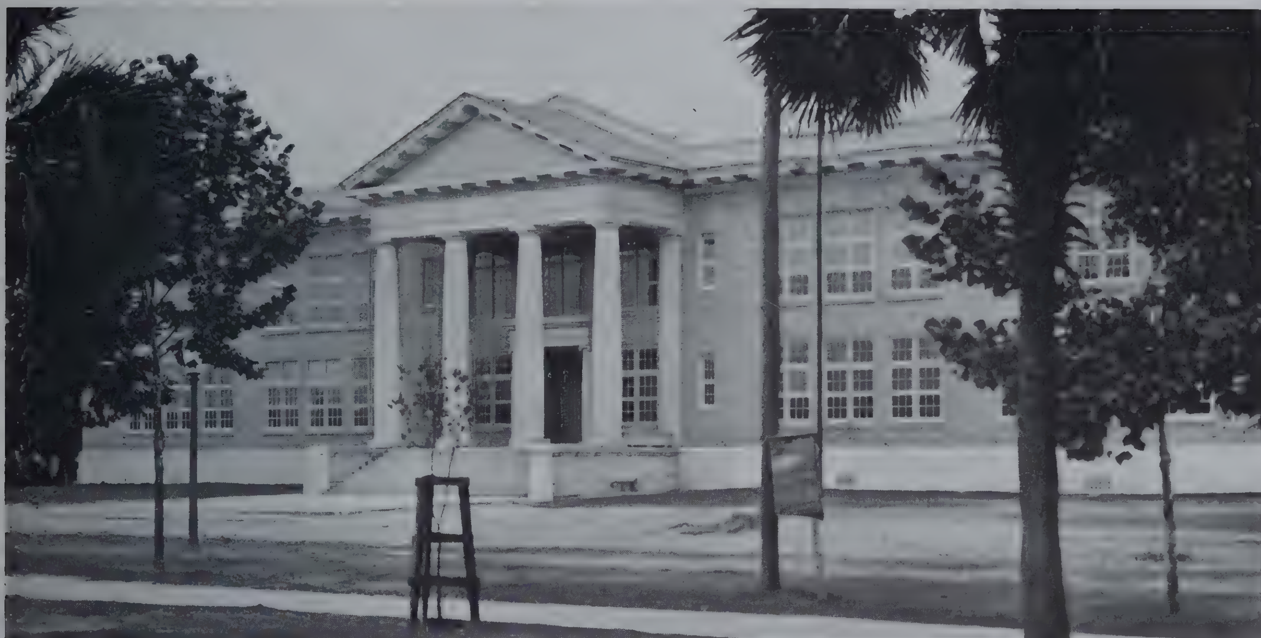
Other details of planning were also systematized. The principal's office and teachers' rooms were approximately 13 x 16 in size and were placed, in each instance, upon the lower floor and near the main

First Floor Plan

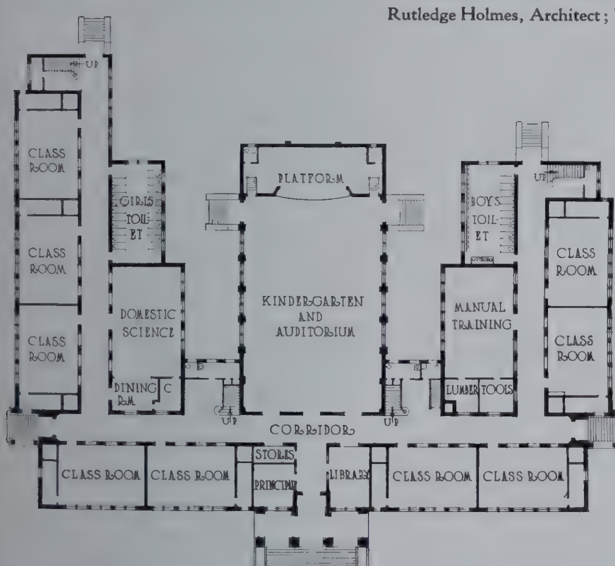


Second Floor Plan

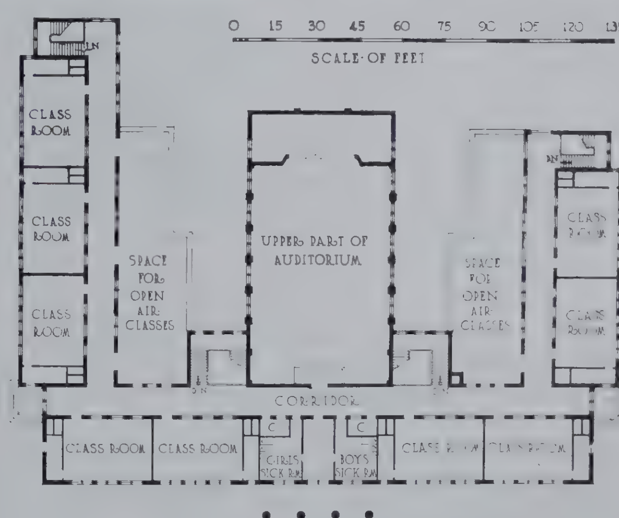
South Jacksonville School, Jacksonville, Florida
Mark & Sheftall, Architects; William B. Ittner, Consulting Architect



General View, Riverside School, Jacksonville, Florida
Rutledge Holmes, Architect; William B. Ittner, Consulting Architect



First Floor Plan



Second Floor Plan

entrance for convenience of administration. The assembly rooms were really combinations of gymnasiums, kindergartens and auditoriums and were connected with the rooms upon the main floors devoted to domestic science or home economics. Each of the assembly rooms was equipped with a small stage and provided with adequate exits. For convenience of service the school library in each building was placed upon the second floor, opening directly to the main stairway and entrance.

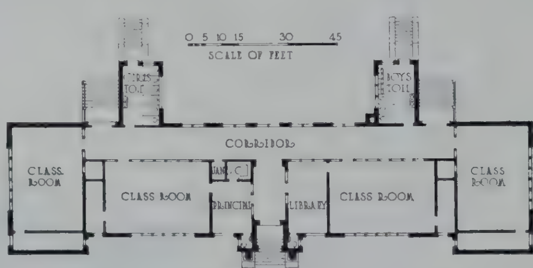
Shop quarters were also worked out upon a definite plan, with a large, undivided area, 24 x 36, upon the main floor, to be subdivided if necessary by movable partitions into smaller shops. Toilet rooms in each school were planned for both floors, those upon the lower floor having entrances from the playground as well as from the corridor. Since there were no basements the boiler rooms were planned apart from the school buildings with their floors somewhat below the first floor levels of the schools.

The St. Petersburg High School, located in one of the rapidly growing Florida communities, shows a more ambitious architectural scheme than the Jacksonville schools and was planned with a view to securing a structure adapted to climatic conditions and adapted as well to the accommodation of a fluctuating number of pupils. St. Petersburg is one of the most popular of the Florida winter resorts and the maximum enrollment is usually reached during the winter months. Although the building is not strictly of an open plan type, owing to the restricted site, maximum lighting and ventilation were secured by means of ventilating windows along the inner walls of classrooms. The building is three stories in height but this height is somewhat modified by reason of the fact that the pupils' entrances give directly to the first or intermediate

Grand Park School, Duval County, Florida
Rutledge Holmes, Architect; William B. Ittner, Consulting Architect

floor, while entrances to the front and rear give to the ground or auditorium floor level.

The building is rich in facilities and equipment, containing besides its classrooms a study hall, an excellent auditorium, a standard gymnasium, home economics rooms, commercial rooms, vocational shops, a full set of science laboratories, free hand drawing and music studios. The classrooms, 14 in number, are planned to accommodate 30 pupils each. One of the rooms, however, was enlarged for double classes. The study hall is located on the second floor. An interesting feature of this hall is that the inner portion is appropriated for reference library uses. This is accomplished by means of a partial partition in the form of an arcade. The auditorium extends through the ground and first floor levels, arranged in amphitheater fashion, and is without gallery. The stage is made of gymnasium size so that indoor games, large choruses, etc., are possible in full view of the audience. There are two laboratory groups, each including a lecture room and an instructor's office. One group includes the physics and chemistry rooms and the other the botany and physiography laboratories.



Plan of Grand Park and Woodstock Schools

The prevocational activities for both boys and girls are well provided for. A cooking room, sewing and millinery room and a model housekeeping suite serve the girls. The school's cafeteria and lunch room connect with this home economics group. A one-story shop wing to the rear of the main building serves the boys. This wing is planned for easy enlargement in case an expansion of curriculum activities should demand it. The commercial rooms on the ground floor serve both boys and girls and include typewriting and bookkeep-

Woodstock School, Duval County, Florida
Rutledge Holmes, Architect; William B. Ittner, Consulting Architect

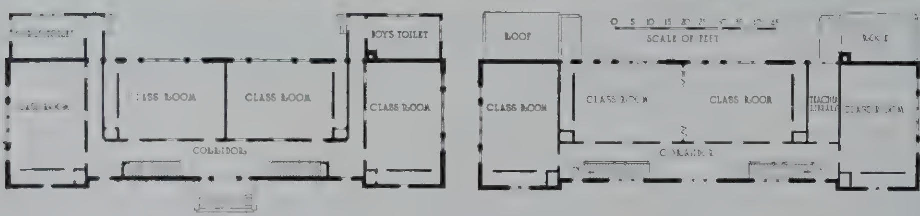
Stanton School, Jacksonville, Florida
Mellon C. Greeley, Architect; William B. Ittner, Consulting Architect
Accommodates 932 pupils and includes Auditorium seating 500

ing rooms. A school bank supplies an interesting addition to the latter rooms. Adequate locker rooms and toilets are located on each floor. Ample provision is also made for showers in connection with the gymnasium.

The building contains several administrative groups, all being located on the main floor. There are rooms for the Board of Education and the Superintendent of Schools. Aside from these, there is an office for the principal of the school besides a general office and the necessary storerooms.

The construction costs on the Jacksonville schools were remarkably low, even for the pre-war year 1917 during which the buildings were completed. The cubic foot cost figures were quite uniform and varied between 11 and 13 cents, which included all

Panama Park School, Jacksonville, Florida
H. J. Klutho, Architect; William B. Ittner, Consulting Architect
Accommodates 448 pupils and includes Auditorium seating 320



Exterior and Plans of Typical School for Colored Children
Mark & Sheftall, Architects; William B. Ittner, Consulting Architect

mechanical and sanitary equipment but not seating or similar furnishings which usually come under the head of equipment. These costs were possible largely through the standardization of plan, and also because of the choice of inexpensive yet wholly durable materials and the absence of elaborate architectural features, either inside or out. The principal purpose in the design of these buildings was to secure efficient school plants, well planned from climatic and administrative points of view; architectural effect was necessarily a secondary consideration, but has been nevertheless achieved to a satisfactory degree with only such elements as mass, general proportions, fenestration and simple cornices and trim as dictated by actual structural requirements, upon which to depend.

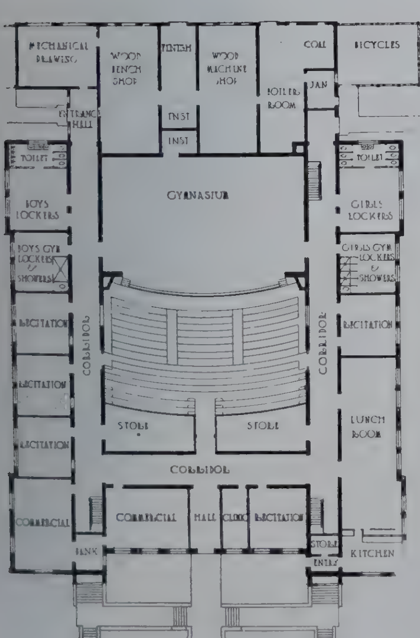
The single-story schools are of second class construction with wood floors, partitions and roof framing and solid exterior walls of brick or tile with stucco coating. The larger schools are of semi-fireproof construction up to the roof levels, the roof framing and ceilings of the second floors being of wood. Exterior walls are generally of brick as are also all bearing partitions; minor partitions between classrooms are of wood, stucco plastered. The floors are of varied types of reinforced concrete, some of beam and girder type with tile fillers where flat plaster ceilings were required, and others of concrete slabs and reinforced supporting girders. Interior stairs are of reinforced concrete with cement finish and equipped with safety treads.

The roofs are of simple, inexpensive construction with wood trusses where they are required; those schools with parapet walls have flat gravel roofs laid on wood boarding; the buildings with visible roofs are for the most part covered with asphalt shingles. Exterior trim and architectural detail on the larger schools are of cast concrete, and in the one-story schools, of wood.

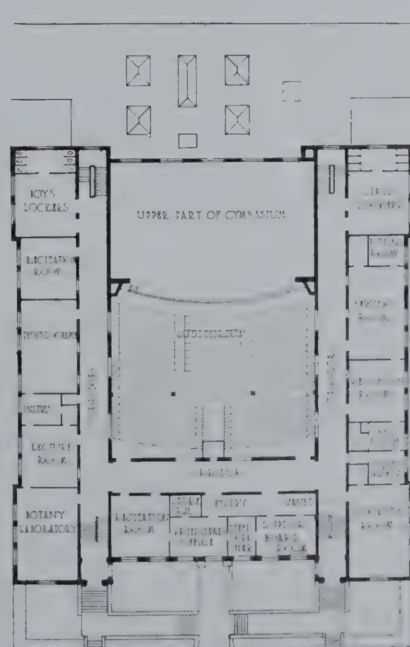
The classrooms are severely plain, finished with tinted plaster walls and in some cases with face brick wainscots to the tops of the blackboards. The windows and doors are set in plaster reveals with no wood trim save a small moulding to cover the frames; all interior window sills are of face brick. Classrooms and corridors have upper floors of wood. The windows are of an open air type.

Fairfield School, Duval County, Florida
Typical of the eight-classroom schools

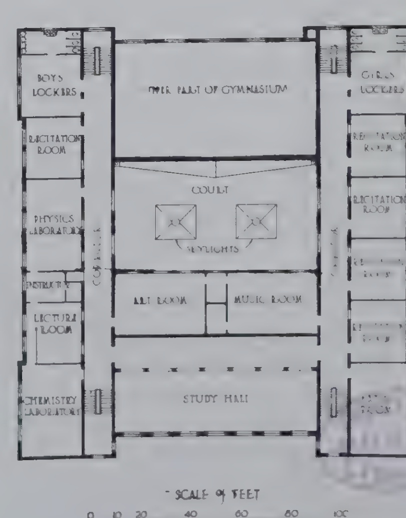
GENERAL VIEW



BASEMENT PLAN



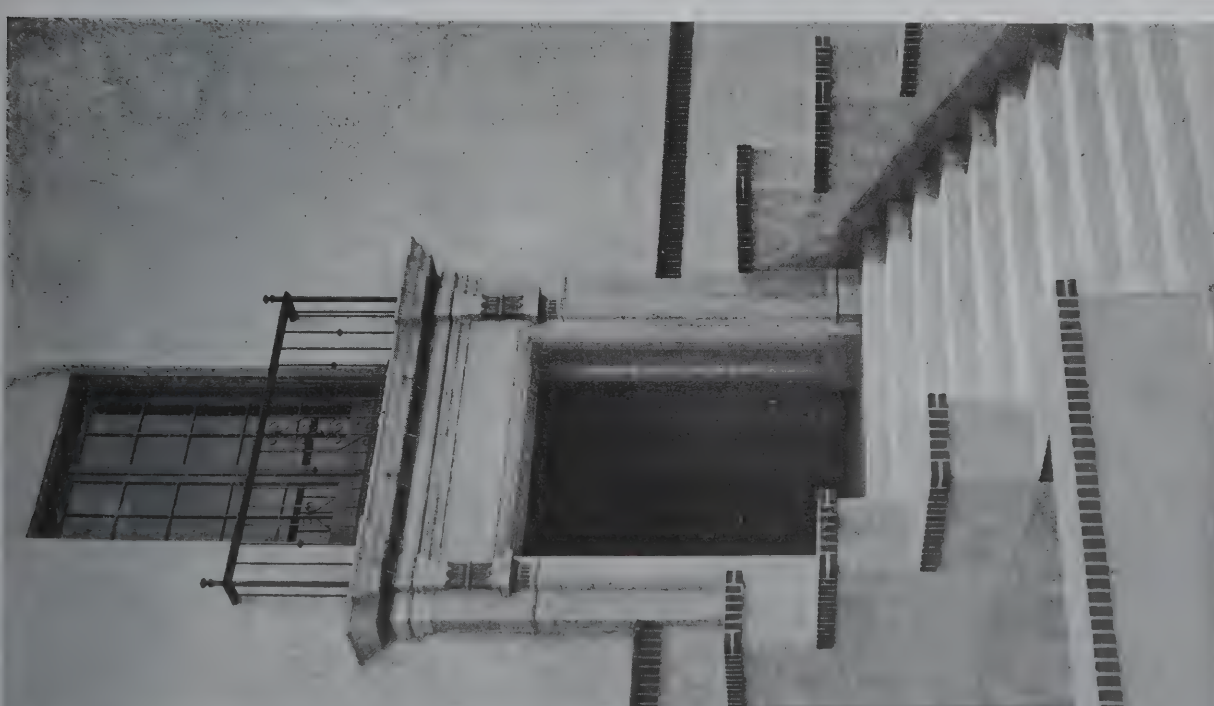
FIRST FLOOR PLAN



SECOND FLOOR PLAN

HIGH SCHOOL, ST. PETERSBURG, FLORIDA

WILLIAM B. ITTNER, ARCHITECT



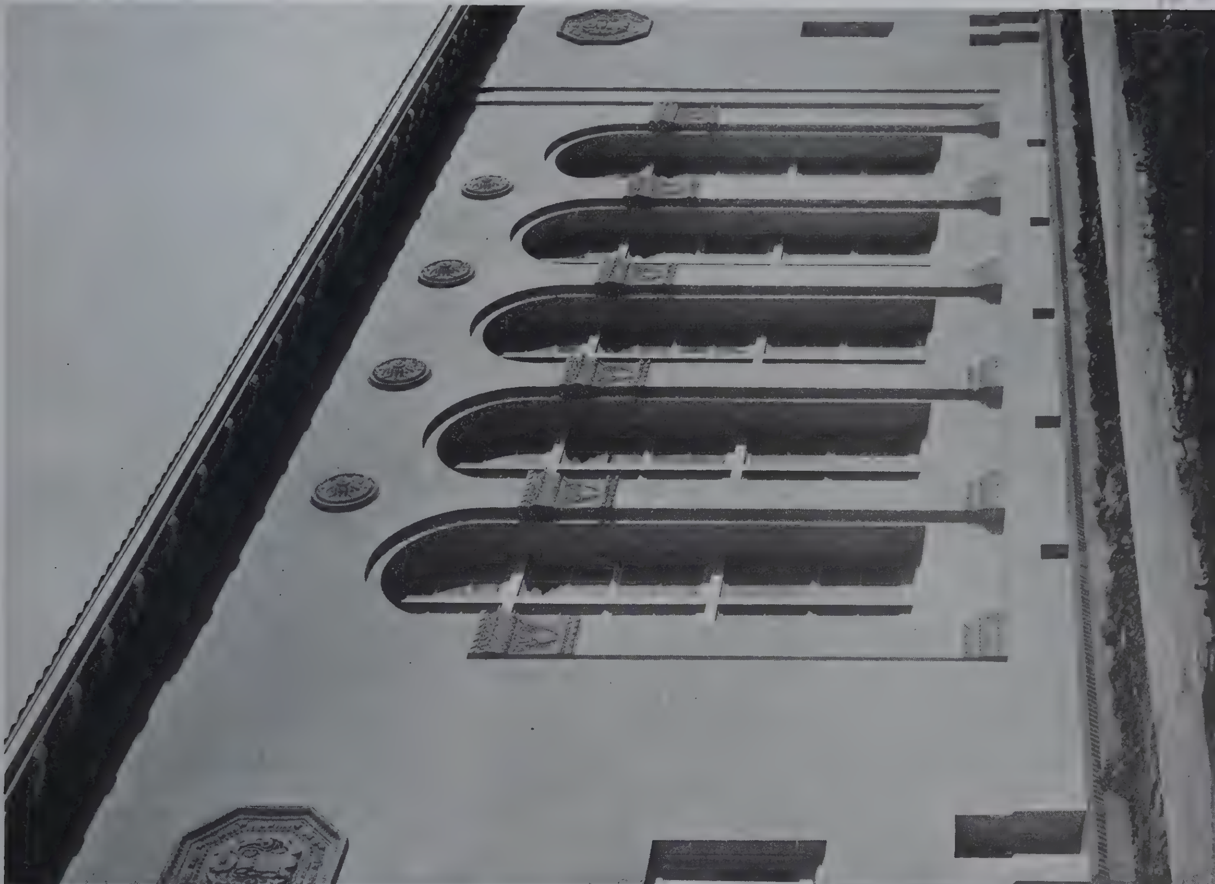
DETAIL OF ENTRANCES TO WINGS

DETAIL OF MAIN ENTRANCE

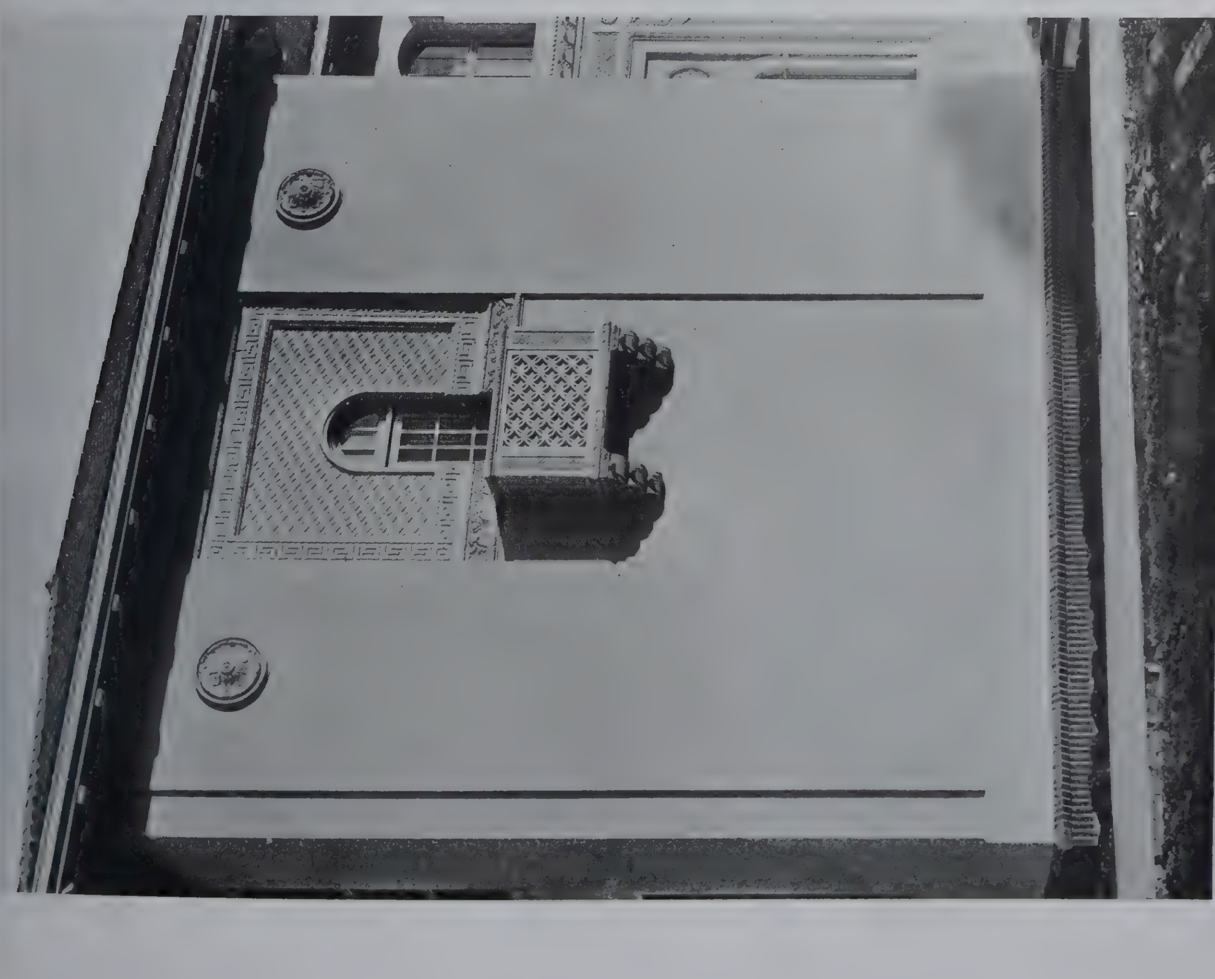
HIGH SCHOOL, ST PETERSBURG, FLORIDA

WILLIAM B. ITTNER, ARCHITECT

GENERAL VIEW
HIGH SCHOOL, WATSONVILLE, CALIF.
WM. H. WEEKS, ARCHITECT



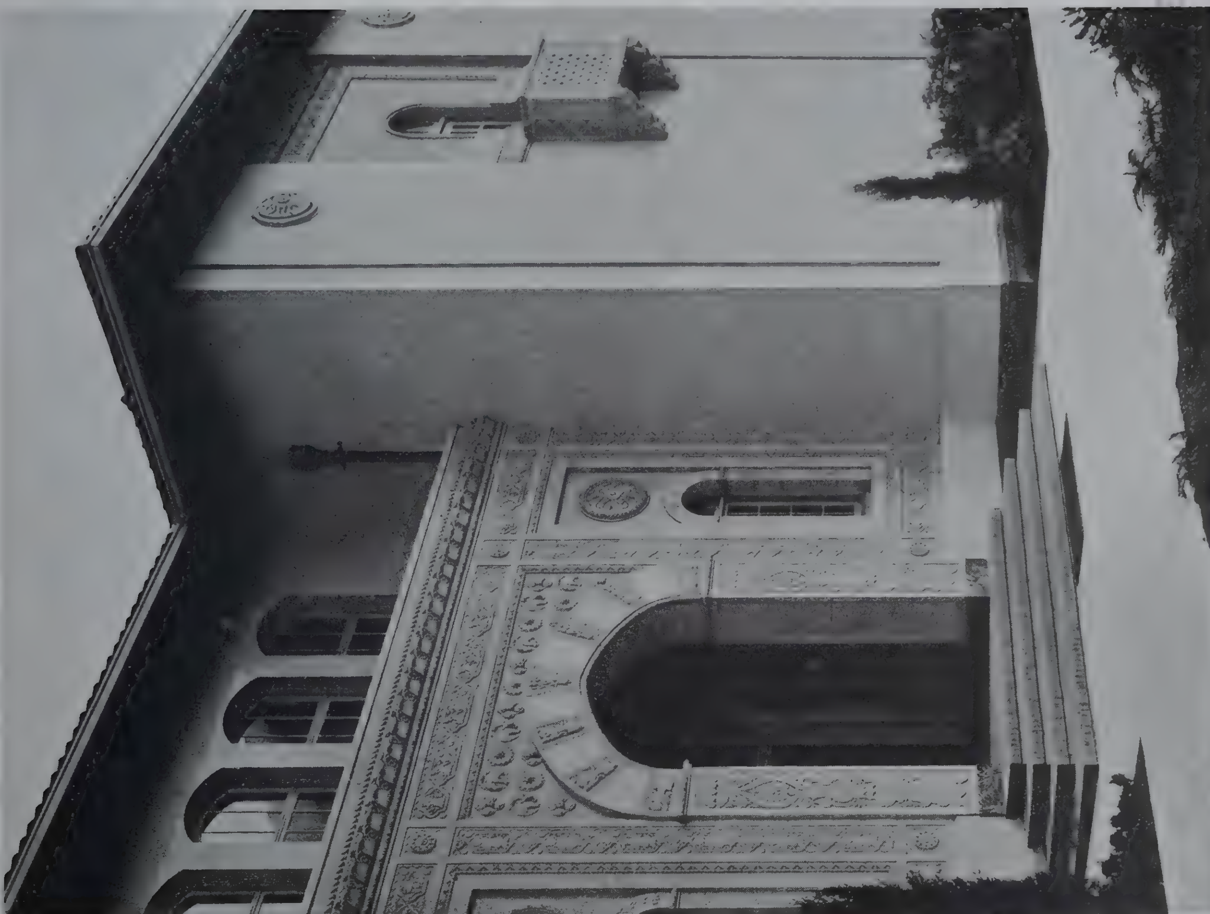
DETAIL OF ASSEMBLY HALL FACADE



DETAIL OF END PAVILION

HIGH SCHOOL, WATSONVILLE, CALIF.

WM. H. WEEKS, ARCHITECT



DETAILS OF ENTRANCE AND END PAVILION

HIGH SCHOOL, WATSONVILLE, CALIF

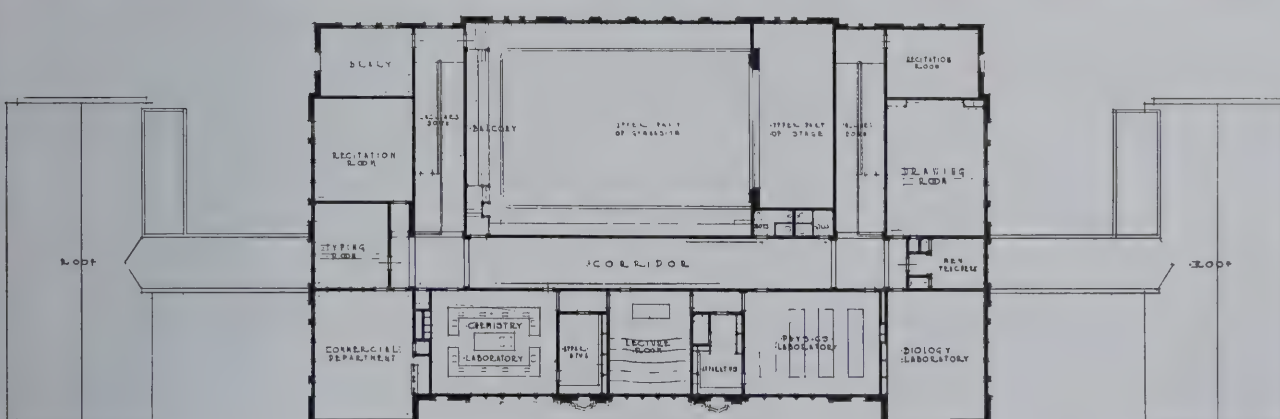
WM. H. WEEKS, ARCHITECT

DETAIL OF ENTRANCE

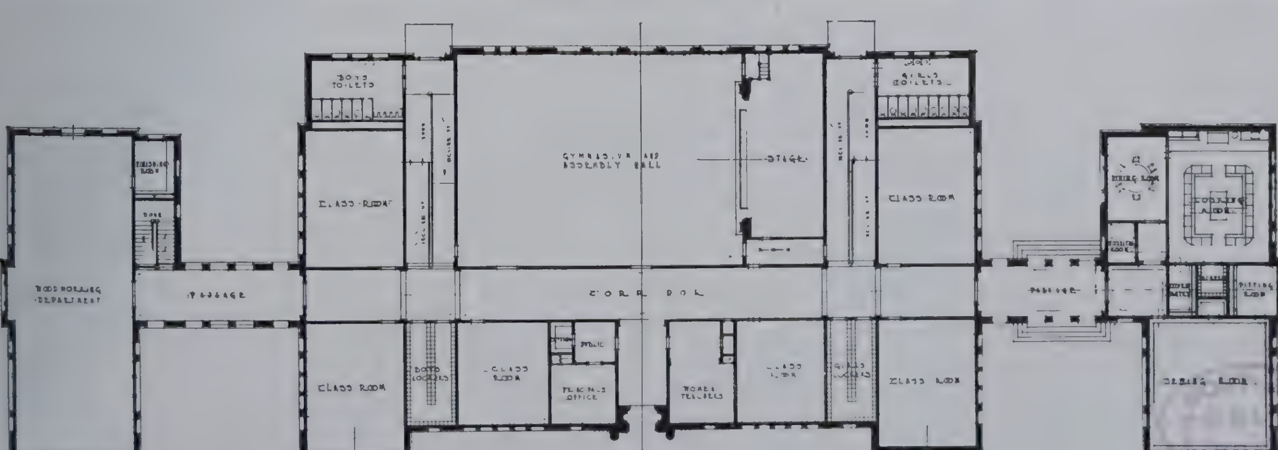
HIGH SCHOOL, HEALDSBURG, CALIF.

WM. H. WEEKS, ARCHITECT

GENERAL VIEW



SECOND FLOOR PLAN



FIRST FLOOR PLAN

HIGH SCHOOL, HEALDSBURG, CALIF.

WM. H. WEEKS, ARCHITECT

Two California Schools

WM. H. WEEKS, ARCHITECT

THE design and plan of school buildings, even under the exacting conditions which the past few years have imposed, are steadily attaining a higher development which will surely have an important influence in raising the general public standards of taste.

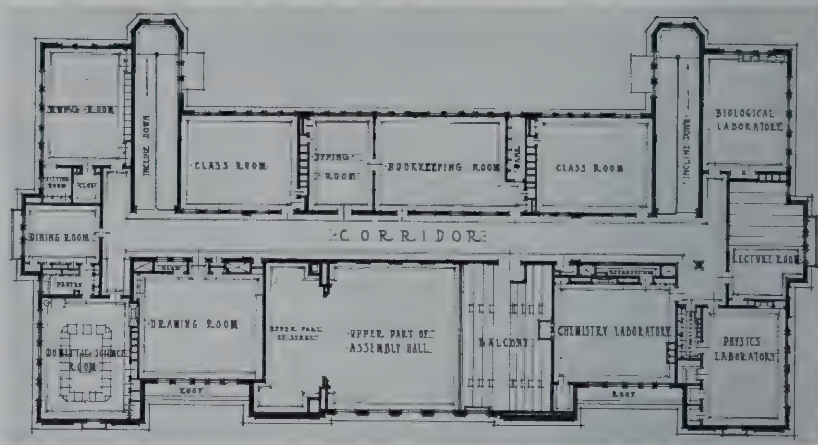
One particular tendency noted today, and perhaps especially in school buildings, is the use of architectural types which are especially associated with particular regions. In THE FORUM for February, 1921, there were shown views of the Tower Hill School at Wilmington, Del., built of brick and of a type which was frequently used in that locality during revolutionary days, and there are many interesting uses of the early New England styles for schools in the east; other parts of the country which have inherited well defined types of building are developing school structures according to their local traditions. No portion of the country is heir to a more marked and distinctive type of architecture than California,—the type in which the early Spanish settlers built their structures, many of which yet remain. These old buildings, which were often of considerable size, were developed in stucco which even the workmen of centuries ago were able to work into simple forms of ornament, and this type adapts itself well to building of concrete and to the use of ornament of terra cotta, cast concrete and other forms of plastic materials.

Plot Plan of Proposed Group at Watsonville

As recent and good examples of modern school buildings, planned in an architectural style which belongs by right of inheritance to the locality and constructed of materials which are in every way suitable and practical, are presented the two California schools illustrated in these pages. The breadth of scale and the wide expanses of wall with which the early Franciscans built their missions adapt well to use for buildings of more than ordinary size. The illustrations of the high school at Watsonville show a structure of marked Spanish characteristics with considerable use of oriental details such as abound in much Spanish work. The use of reinforced concrete with plain surfaces treated with waterproof cement coating for the walls and the massing of ornament of cast concrete about doorways, balconies and at certain other points, create that strong contrast, that play of light and shadow amid surfaces plain and unadorned, which has always been highly valued by Spanish builders. Entirely unbroken by dormers of any kind are the broad roof surfaces covered with tiles which project over the walls themselves to form wide soffits. The architect, in this instance, has been unusually successful in the treatment of window spaces. Particu-

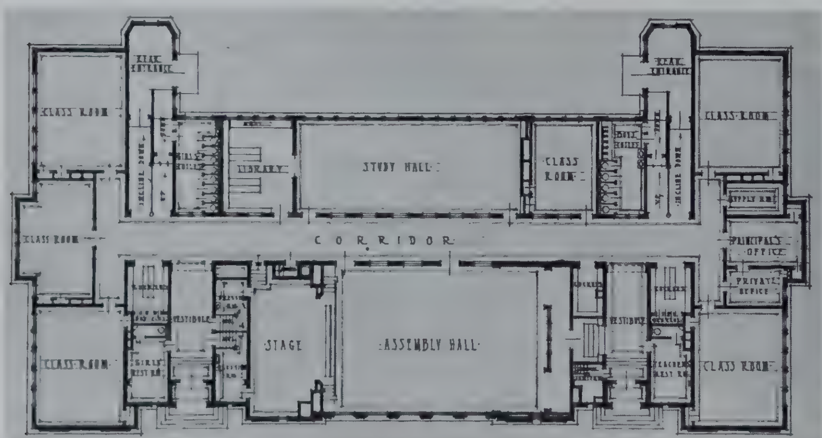
Rear of Watsonville High School Showing Expanse of Sash for Convertible Open Air Rooms

larly in a school building large windows are necessary, but ordinarily they are so disposed that they give to school structures much of the appearance of model factory buildings. The use of color in various ways adds materially to the interest of this building. The rich color and texture of the brick used for steps and entrance platforms and for the foundations where they are exposed, afford an excellent contrast with the concrete walls. The cornices and the trim about windows are of gray-green.



Second Floor Plan, Watsonville High School

This is one of a group of three school buildings which will eventually form a notable educational center. The plan of the structure already completed presents an excellent arrangement for a school of this kind in which are taught all the subjects now generally included in the high school curriculum. A considerable portion of the main floor is planned as an assembly hall, seating about 600, with a stage and the usual dressing rooms, and since this hall is of full two-story height a balcony at one end provides additional seating capacity. This assembly hall embodies several interesting details of equipment. A portion of the floor is level, that it may be used for dancing or exercises requiring a level space; provision has been made for storing the seats in a space under the floor, and the electric lights in the ceiling are arranged to be lowered on cables for replacement or cleaning. The stage is arranged for the use of stage effects, and with provision for raising instead of lowering scenery. The use of motion pictures is similarly provided for.



First Floor Plan

The liberal planning of the building makes possible such other departments as a study hall, a library, lecture room, laboratories for the use of the departments of chemistry, physics and biology, and an office and a private office for the principal. The larger of the rooms devoted to the teaching of domestic science is placed at one corner of the building and connects through a pantry with a dining room in which meals are served from the domestic science department. Study of the floor plans will show an unusually successful working out of entrances, particularly from the school playgrounds, with ramps or inclines instead of stairways between different floor levels. This use of ramps is said to be the first instance of their installation in a school and promises to remove entirely the possibility of stumbling with consequent loss of life in case of a panic; the ramps have a slope of approximately 20 per cent and are, furthermore, fireproof. An added factor of safety is the provision by which doors

Domestic Science Room, Watsonville High School

between classrooms and halls open *out* to facilitate egress from such rooms.

The building faces north and is so orientated that assembly hall, drawing rooms and laboratories take up this frontage, leaving the classrooms situated to receive direct sunlight. Arrangement and equipment of the various laboratories are unusually good and are the result of careful thought and attention to details. The chemical laboratory is a fireproof room having an artificial stone floor and concrete and metal walls. Every possible detail of equipment has been supplied to provide all facilities for the work of the department; numerous sinks are supplied with hot and cold water and the tops of the tables and counters are of material proof against injury by chemicals, acids or even careless handling. A useful feature is the installing of individual experimental hoods for the use of pupils, these hoods being connected with specially made exhaust fans for the removal of fumes. In the biological laboratory are glass topped tables, cases and sinks necessary for such a department, and all the laboratories are provided with the necessary rooms for the storage of supplies and apparatus.

Typical Ramp as Used in the Watsonville and Healdsburg High Schools
This Feature Has Won the Approval of Local Authorities

The rooms devoted to the teaching of domestic science, which have already been mentioned, are also unusually complete and besides the cooking room, pantry and dining room, include fitting and sewing rooms. In the cooking room the tables with tops of artificial stone, intended for the use of pupils, are placed about a hollow square, the instructor being in the center. Each pupil's table is provided with an individual gas stove. This cooking room is finished in white enamel and with its water heater, storage closets, cupboards, wash trays, sink, cooling closet and other items of equipment is complete with every detail which would ordinarily be found in a well planned kitchen. In the fitting and sewing rooms are lockers and exhibit cases, ironing boards, triplicate mirrors and divers other conveniences which aid in the effective teaching of the branches to which the rooms are devoted. The drawing room, which might perhaps be regarded as a part of the equipment for teaching domestic science, is fitted with exhibition cases and plate rail and has its walls covered with monk's cloth upon which to pin prints and drawings.

The woodwork throughout this school building, excepting where special finishes are required, is stained aluminum gray with a dull surface, and the walls are tinted.

By the use of specially designed windows it is possible to make every room an open air classroom. These windows are reversible for cleaning. Skylights are provided in north rooms so that sunlight can be

Elevation of the Healdsburg High School as It Will Appear with Pavilions at Either Side

View of Physical Laboratory, Watsonville High School

of much the same nature but extending over a somewhat greater area. Here there will shortly be built pavilions at either side of the main building and joined to it by covered passageways. One of these pavilions is intended for the teaching of wood working with shops, forge rooms and garage below, while the other pavilion will accommodate the departments devoted to domestic science in its several forms. This school is also equipped with ramps to be used instead of the usual staircases and there is the same ample provision for chemical, biological and physical laboratories which characterizes the school at Watsonville. In this Healdsburg school the assembly room is planned to do duty also as a gymnasium, while directly beneath space in the basement is intended to be used for showers and dressing rooms. The architecture here is of the Spanish colonial type; reinforced concrete has been used for walls and floors and also for the ramps which here, as in the Watsonville High School, are covered with cork linoleum cemented to the concrete. The details of ornamentation about the main entrance are of terra cotta and the rest of the exterior ornament is of cast concrete.

In planning both of these school buildings the architect has made full provision for athletic fields and playgrounds. The Healdsburg School was erected in 1919 at a cost of $100,000 and the Watsonville School for the same amount one year earlier.

introduced for sanitary reasons and additional light be secured on dull days. Heating and ventilation are provided by a plenum system in which the air from outside is forced over air warmers and into each room, providing an eight-minute change of air throughout. The air entering the rooms is under automatic control so that the desired temperature may be maintained. Oil burning equipment for the heating system includes apparatus for using the cheapest grades of crude fuel oil. One detail of the equipment consists of a large sized steel oil storage tank which is buried under ground to insure safety but which can be readily filled by gravity from an oil supply tank wagon. From this storage tank the oil is supplied to the burners by a small electrically driven oil pump. Plumbing throughout is of a type calculated to resist hard wear, always to be expected in a school. All of the piping and valves connected with the toilets are centered in a utility chamber and are exposed for quick adjustment or repair. Floors in toilet rooms are of metal and concrete construction and fixtures are of porcelain. These rooms are vented by means of an electrically driven fan changing the air every ten minutes.

The illustrations and plans of the high school building at Healdsburg, the main part of which has been recently completed, exhibit a different but equally successful arrangement of a structure planned for a school

View of Chemical Laboratory, Watsonville High School

The Effect of Zoning upon Living Conditions*

By HERBERT S. SWAN

MUCH theorizing has been indulged in as to the benefit zoning might accomplish, but what good has it actually achieved? That is a question we city planners must answer soon, for if the time has not arrived it is rapidly arriving when our theories must be backed up with solid achievement or both we and our theories will stand discredited.

The time during which zoning has been in effect, even in the cities which were the first to adopt it, has been very brief; indeed, much too brief to permit us at this moment to make a precise appraisal as to its ultimate value in solving our planning problems. It is, however, interesting to note that experience is rapidly accumulating to justify the earlier promises—and among them some of the most extravagant promises—as to what zoning would accomplish. From my own personal observation, I can tell of instance after instance where zoning has proved, and is proving, of the utmost value in improving both the technique and the art of living.

Preventing the Spoiling of Residence Districts

In Yonkers, for instance, the zoning ordinance took effect upon the same day that the restrictions in one of the largest and finest home sections of the city expired. Here was no fatal interim between the time the covenants running with the land terminated and those imposed by law began to operate. Unscrupulous speculators, waiting to exploit the suburban character of the district by putting up parasitic buildings, did not get a chance to file their plans, with the result that building under the zoning ordinance went right on where it left off under the private restrictions.

In Newark there was one unrestricted vacant lot in the very heart of a highly restricted neighborhood. The owner of this plot could put his property to any use he chose—to building an apartment, factory, store or garage; adjoining owners could erect only one-family, detached houses. Neighboring property owners repeatedly attempted to enter into an agreement with the owner of this plot, with a view to having him bind himself in the same manner that they had already bound themselves, but he paid no heed to their entreaties. The result was that all development within a radius of several hundred feet of this plot was paralyzed—no one dared to build himself a home next to this plot so long as he didn't know to what use it would be put. With the adoption of zoning in Newark, this lot was subjected to practically the same regulations as governed adjoining lots. Property that was formerly unmarketable is now being developed and improved on all sides of the un-neighborly neighbor, who is now powerless to give practical effect to his threats of erecting an objectionable building.

Preserving Uniform Building Lines

The requirements as to uniform building lines in front of houses are proving their value every day in such communities as have established them. In Newark, the first city in the United States to adopt a comprehensive plan for such control, owners who have made excavations for their cellars before filing their plans have, on several occasions, been obliged to dig new cellars farther back on their lots in order to comply with the building lines observed by neighboring property owners.

A few months after the adoption of zoning in White Plains, a member of the city plan commission proposed to erect an accessory garage upon his property. As his lot had a small terrace in front, he intended to construct the garage by digging it into the bank in front of his house. Had he done so, the roof of the garage would have projected some 5 feet above the level of his front porch. The zoning regulations which he himself had helped to frame, however, prevented his disfiguring his own home. To his present great satisfaction, the garage had to be constructed in the rear of the house.

Permanency of Districts

A frequent remark heard in unzoned communities concerning zoning is that the regulations and districts constitute merely the expression of a pious wish; that they will endure only until somebody wants them changed, and that the provisions of the ordinance will be juggled to suit everybody's convenience. Experience affords no support to such statements. Regulations adopted after full public discussion and conference with property owners become so deeply rooted in the community that they can be changed only when such change is thoroughly justified. The first year or two is always bound to be the most trying to enforcing a zoning ordinance. The newness of the regulations, the conflict of opinion as to how different areas should have been restricted and the lack of any building carried out in accordance with the plan, all tend to make the first year or so a critical period. And yet in communities that have adopted zoning, the changes in districts have been remarkably few. During the first 16 months of its operation, there have been but five minor changes in the districts laid down by the Newark ordinance. During the first 10 months of the Yonkers ordinance, there has been but one. The districts in White Plains are all identically the same today as 11 months ago under the original ordinance and other instances might be cited where results have been about the same.

* An address delivered before the recent National Conference on City Planning, held at Pittsburgh.

Exclusion of Dwellings from Industrial Districts

But maintenance of the original zones has not been accomplished entirely without opposition. An excellent illustration of what pressure an administration will withstand to uphold unchanged a zoning plan is afforded in Newark. The Newark ordinance, it will be recalled, excludes residential buildings from the heavy industrial districts. The area so restricted consists of meadow land, largely salt marsh, developed with chemical plants, tanneries, shipways, foundries, railroad yards, etc., and embraces about one-fourth of the entire area within the city. As a heavy industrial district, this locality is unequaled in the metropolitan area —low, level ground, held in large tracts; deep water, transcontinental railroads; close proximity to a large consuming public and an unlimited supply of stable labor—all afford it an unexcelled opportunity for attracting establishments seeking sites uniquely situated with reference to efficient large-scale production. To allow it to be gridironed with a rectangular street system and subdivided into blocks 200 feet wide and 600 or 700 feet long, with the land developed in 25-foot units, would utterly destroy the most magnificent industrial opportunity ever possessed by a community. The welfare of the future residential development of the city also demanded the exclusion of dwellings from this area. Any houses erected in such an environment would have been predestined to become slums.

Half a year ago, a manufacturer appeared before the Board of Commissioners with a petition to have a small portion of the district transferred to a zone in which residences would be allowed so that he might construct 61 houses for workmen employed at his plant. The petition was promptly denied. In refusing to grant the request the city fathers pointed out that the tract in question was so situated that it had practically none of the social conveniences indispensable to residential occupancy, being more than a mile from any store, church, school or moving picture theater; that it possessed none of the public utilities, neither water, gas, streets, sewers nor trolleys, and that to provide these utilities would only squander the city's resources upon improvements which would in the long run prejudice the growth of the city by forcing industries into localities less favorably situated.

Through the exclusion of dwellings from industrial districts and the exclusion of factories from residence localities, zoning is being relied upon in Hoboken as one of the chief agencies in the development of an industrial terminal. This plan includes, among other things, the complete revision of the street system throughout one-fifth of the city's area, abolishing more than half of the existing thoroughfares, widening others and laying out new streets. The plans for this area call for an industrial terminal equipped with facilities of direct rail shipment by every railroad, direct shipment by water from the docks immediately in the neighborhood, cheap power from a central station, and warehouses and factories erected to accommodate either single tenants or groups of tenants, with railway tracks connecting not only all the factories with one another but the piers and the classification yard and through the latter with the several trunk lines. Without zoning, it is questionable whether this plan could even be considered.

Percentage of Lot Area Occupied by Building

The provision limiting the percentage of lots which buildings may occupy is accompanied with so many benefits to the community, direct and indirect, that one can hardly suppress an exclamation of surprise when a long-time member of the conference waves it aside with a remark that it is "entirely superfluous," and that it "secures little if any extra advantage while it considerably increases the difficulty of applying the ordinance." Following out this theory, the zoning ordinance prepared by this member relies exclusively upon the provisions limiting the heights and regulating the sizes of courts and yards in restricting the bulk of buildings. So long as buildings conform to these general requirements they may occupy any proportion of the lot areas their owners choose. Everybody certainly agrees to the proposition that a zoning ordinance should be stripped of all superfluous matter; that provisions securing no extra advantage should be eliminated, and that the control exercised over building development should be as simple and direct as possible. These are axiomatic considerations. Nobody would for a single moment question them. But we do wish our zoning regulations to be adequate to the needs of the situation.

Under the ordinance just mentioned the regulations permit buildings to occupy from 50 to 70 per cent of the lots even in the districts that are now improved with private houses situated on lots having a width of 50 feet and occupying but 20 and 25 per cent of the ground. Under zoning ordinances adopted by adjoining communities similar types of development are limited to 30 per cent of the lots. This zoning ordinance, however, permits two-story buildings on lots 30 and 35 feet wide, generally speaking, to occupy from 45 to 55 per cent of the lots; on lots 50 feet wide, between 50 and 60 per cent, and on lots 100 feet wide between 60 and 70 per cent. The only limitations preventing buildings from covering the entire lots are the requirements relating to yards—a side yard of a width varying between 4 and 6 feet on either side of the building, a rear yard and a front yard in the case of buildings on streets less than 80 feet wide.

Are our best residence districts entitled to no more protection than is afforded by such regulations? The suburban character of a neighborhood, it is safe to assert, can never be maintained if buildings are to cover from one-half to three-

quarters of the land. Requiring an open space of 8 or 12 feet in width between buildings is not in itself sufficient to maintain the amenities of one-family or two-family detached house districts. Additional space must be kept open, else the only distinction between our tenement districts and our home districts will be in the heights of buildings and the kind—not the amount of open space surrounding buildings. Far from being "superfluous," the provision limiting the proportion of lot areas which buildings may occupy is one of the most useful in our zoning ordinances. It affords additional light and air; it promotes family privacy; it encourages the maintenance of lawns with grass and trees; it provides additional play spaces for children, off of dangerous traffic streets, and it segregates homogeneous types of buildings.

For five years past I have at every opportunity, in and out of season, at the risk of being considered a crank, urged the necessity of limiting the ever-increasing congestion of population in our cities. When the New York ordinance was in its formative stages, I worked for the adoption of a provision limiting the number of families that might be housed to the acre. At that time, however, such a measure was considered too advanced to be taken seriously. Three years later, however, in framing the Newark regulations, I succeeded in having this provision incorporated in the ordinance, this being the first time that such a provision had ever been adopted in the United States, though Yonkers, White Plains, Cliffside Park, Glen Ridge and Montclair were soon to follow with similar regulations.

The over-development of a small percentage of a city's area may result in a few owners waxing rich, but their "hogging" the land and capitalizing congestion also results in making slaves of many more, saddling them with increased taxes and assessments and depriving them for years and perhaps forever from deriving any revenue from their property. Because a building houses 50 families, it does not necessarily follow that there are builders anxious to buy all the vacant plots in the neighborhood with a view of erecting 50-family houses on them. The contrary is more apt to be true. The fact that a 50-family house has been built where only a 25-family house should have been erected has the effect of causing other lots to remain vacant when they might otherwise have been improved, and of holding in abeyance the effective demand for them until the increased population again warrants the erection of a large multi-family house.

Objection has been raised to limiting the number of familes to the acre on the score that reducing the density of population will require the subdivision and improvement of a larger superficial land area. The less densely people are housed, the greater undoubtedly will be the actual length of the streets and the extent of public utilities required to serve them. But it is not to be expected that the cost of land per family will increase at all in the same proportion as the diminution in the number of families to the acre. The economies obtainable through narrower streets and lighter pavements, possible with a sparser population, go a long way—if not the whole way—in offsetting the greater length of roadways, sewers, etc., necessary to develop the land. The aggregate increment in values throughout a city will not be lessened by limiting in a reasonable manner the number of families that may be housed on a given unit of land. On the contrary, it will be increased, given a broader base and made more stable. And who would deny that, viewed in every way, it is more desirable that this increment should be shared by a large number of owners than by a mere handful?

There are persons who believe regulations directly limiting congestion of population to be superfluous, just as there are persons who believe provisions restricting the percentage of lots that buildings may occupy to be unnecessary, but the method is commending itself to an increasing number of cities,—Mr. Bartholomew having obtained its adoption in Evanston, Ill., Mr. Whitten in Lakewood, Ohio, and Mr. Comey in Milwaukee.

Suburban Zoning

In the past our states have hesitated and delayed in passing welfare legislation on the ground that the enactment of laws relating to shorter hours of labor, the abolishment of child labor, the provision of old age pensions, compensation for industrial accidents, etc., would result in a situation where the state maintaining the lowest standards would enjoy such superior advantages in competitive markets as to make the adoption of such laws nothing short of disastrous to local industry. Whether this contention has or has not been borne out by experience is somewhat outside the scope of the present discussion, except insofar as it relates to the enactment of zoning regulations. Strange to say, when it comes to zoning this objection has never been raised; on the contrary, the general impression seems to prevail, and very justifiably so, too, that the unzoned community is at a very serious disadvantage as compared with the community that has adopted a zoning ordinance. Especially is this so in the cases of metropolitan areas with numerous suburbs.

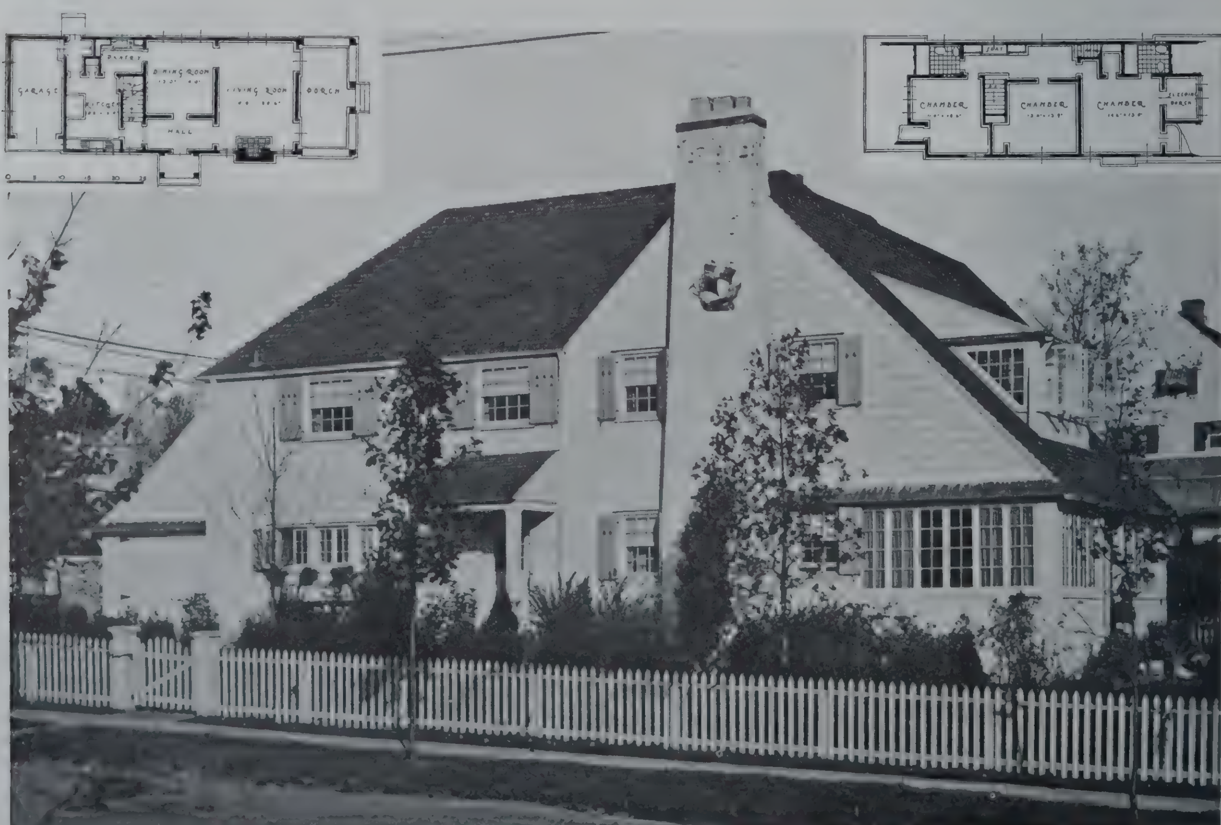
In such instances, the prospective home buyer is more and more often asking himself the question, "Why should I buy my home in an unzoned town, where my house may at any moment be flanked with apartments, factories or garages and its value seriously impaired, when for the same price I can buy just as good a house in a town that thinks enough of its homes to protect them with the strong arm of the law against injurious neighbors?" The mortgage lender, too, is with increasing frequency asking himself, "Why should I lend my money on property which may at any time have its value so depreciated through the construction of objectionable neighboring buildings that I may be forced to institute foreclosure proceedings and buy the property myself in order to protect my equity,

when in an adjoining suburb I can invest my money in real estate mortgages with the community itself guaranteeing the value of the property, as it were, against premature depreciation through precipitate and unwarranted changes in the building's environment by preventing the intrusion of undesirable development in the neighborhood?"

The practical effect of these considerations is most interesting. The zoned localities are not only absorbing the better grade of developments at the expense of the unzoned suburbs, but they are forcing the undesirable types of development into the unzoned towns. The builders, architects and real estate owners in unzoned towns are with increasing persistence urging their councils to adopt zoning so that they may have as good a sales proposition to make to prospective clients as competing builders, architects and real estate owners in zoned towns. An occasional sale lost now and then to a rival in a zoned suburb and the increasing reluctance on the part of lending interests to make loans on unprotected property—or if making loans, their discrimination in favor of protected localities with reference to both the interest rate charged and the amount loaned—considerations like these are proving more powerful than words in actually stirring unzoned towns to action.

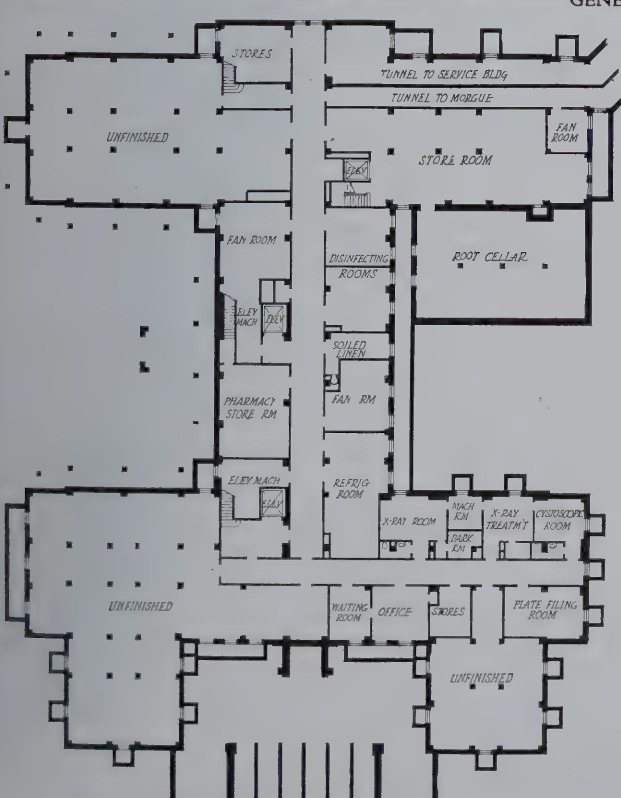
Though these communities have done nothing to adopt zoning, it is not quite exact to say that they are unzoned. The adoption of zoning by neighboring communities has in a sense already zoned them. Without their knowing it, they have been placed, as it were, in the position of unrestricted districts to their neighbors. Though they themselves may not have moved, their neighbors have. Today, therefore, they are not at all in the position they were in years ago when building was unregulated everywhere. Then, due to the universal lack of control, they stood on a par with their neighbors—ownership of property within their boundaries was accompanied by neither privileges nor handicaps not accompanying it elsewhere. But now this has all been changed. The fact that property is protected elsewhere makes its ownership in those places more desirable; that it is not protected here makes its ownership locally less attractive. To permit our neighbors' garages and factories to locate indiscriminately in our residence districts, while they exclude ours, can have but one result—it destroys the marketability of our residence property at the same time that it makes our competitors' more salable.

Zoning is both a positive and a negative factor in the development of a community—it encourages superior types of development; it discourages inferior types of development. Its mandatory provisions oblige things to be done which otherwise would not be done; inhibitions prevent things from being done which would otherwise be done. It stimulates, checks, guides—all to the benefit and lasting good of the community and this benefit will become increasingly apparent with the passing years.



House at Bronxville, New York. Julius Gregory, Architect

GENERAL VIEW



BASEMENT FLOOR PLAN

GROUND FLOOR PLAN

THE CHARLES T MILLER HOSPITAL, ST PAUL, MINN

C. H JOHNSTON, ARCHITECT

DETAIL OF ENTRANCE

FOURTH FLOOR PLAN

TYPICAL FLOOR PLAN

THE CHARLES T. MILLER HOSPITAL, ST. PAUL, MINN.

C. H. JOHNSTON, ARCHITECT

HOUSE FROM THE LAWN

VIEW FROM THE ROAD

HOUSE OF FRANCIS L COOLIDGE, ESQ., MILTON, MASS

GEORGE F SHEPARD, ARCHITECT

DETAIL OF STAIRWAY

FIRST AND SECOND FLOOR PLANS

HOUSE OF FRANCIS L. COOLIDGE, ESQ., MILTON, MASS

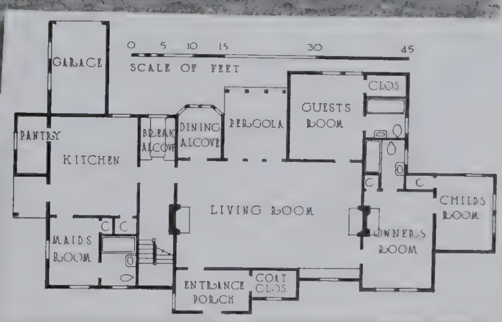
GEORGE F. SHEPARD, ARCHITECT

,DINING ROOM

LIBRARY

HOUSE OF FRANCIS L. COOLIDGE, ESQ., MILTON, MASS

GEORGE F SHEPARD, ARCHITECT



HOUSE OF PAUL SHIELDS, ESQ, GREAT NECK, LONG ISLAND, N Y

CHESTER A PATTERSON, ARCHITECT

The Prevention of Heat Losses

By WHARTON CLAY

HEAT loss through exterior walls has long been taken as a matter of course by architects, builders and owners alike, so there is much room for investigation and a crying need for prompt application of such lessons as have already been taught by scientific discovery. When one realizes that it has been proved from actual tests that there is a difference of 221% in the heat insulation properties of two widely used materials for exterior walls, together with a relatively similar difference in coal bills, it is apparent that accurate information is needed by the profession and that study of the subject will richly reward the architect who considers the economic as well as the artistic interests of his clients.

The lack of information regarding loss of heat through exterior walls is well illustrated by the statement of John R. Allen, in reporting on the research work of the American Society of Heating and Ventilating Engineers, that more coal is used per room in Texas and Georgia than in North and South Dakota. These latter states have given more consideration to efficient methods of insulating exterior walls. Many tests of thermal conductivity have been made in the past, but they have been largely concerned with either walls for refrigeration purposes or pipe covering, or else they have compared the specific values of different types of insulation. Hence, an elaborate series of tests on full sized models of common exterior walls, using common building paper in several different ways, brings the series "down to brass tacks," as the results can be applied directly in ordinary, everyday practice.

The basic principles of heat insulation must be fully understood in order that certain popular misconceptions may be avoided. If we turn to any school book on physics we will find there is no such thing as "cold"; it is merely the "absence of heat." Heat is a form of energy which comes from friction, and from chemical combinations producing what is commonly known as combustion.

Heat travels by three distinct and different modes—conduction, radiation and convection—and regarding each a brief explanation should be given.

1. Conduction. This may be illustrated with a teaspoon or the handle of a coffee pot. Heat travels through hard bodies such as metals and earthenware more easily than through wood, paper or fabrics. That is why we use metal and earthenware cooking utensils and stoves—because we want the heat on one side to quickly and easily travel through the material to the other side. But if we want to insulate the heat—in a flatiron, for instance, or a tea pot—we put a wooden handle on it. Part of the heat of a building escapes by conduction and we must use slow conductors in the wall to save the loss in this manner. Wood studs in the exterior walls are excellent for this purpose as they combine both strength and non-conductivity. Earthenware and metals, being rapid conductors of heat, should be avoided when so placed that any part forms a continuous bridge through a wall. A sure loss of heat by conduction will result, unless a radically different method is used.

2. Radiation is the second method of heat transference and is the process by which heat waves are carried through space. When one stands before an open grate the heat travels to one by radiation. Thus the name of the steam radiator is derived, because the heat of the steam, passing readily through the thin metal shell by conduction, is radiated in all directions. This action has little value in construction, and any difference that occurs in this manner is due to the texture and color of the exterior and varies with weather conditions. A smooth surface, being less radiating than a rough, and a white surface less radiating than a black, the difference is the same for the same color or texture of surface, regardless of the internal construction of the wall itself.

3. Convection, therefore, is last but in many respects the most important form of transference, especially in all types of hollow walls. Surely it is the form least generally understood. This is the method of transfer of heat which is exercised when air is heated; it rises because of its lighter weight; comes in contact with a colder surface; loses its heat; falls, due to its greater weight when cooled, and when it is again heated, rises to repeat the process of circulation. It is this circulation of the heated air which warms a house from a furnace or makes the upper part of a room warmer than the part near the floor.

The application of convection to hollow walls comes, therefore, in the effect of the air currents within the hollow spaces. The popularly styled "dead air space" is a fine insulation—*if it is "dead"!* But if it is "live," that is, wide enough to permit circulation, the "air space" is the worst thing possible, as this moving air is a splendid means for assisting the inside heat to escape to the outside shell of the hollow wall. The effect of the size of the air space is illustrated by a swarm of flies in a large cage in which they have room to fly around—live air space; but bring the walls close together and they will be confined and held in place—that is the dead air.

As the effect of walls upon passage of heat has heretofore been carefully studied chiefly in relation to cold storage and refrigeration, let us turn to the *Journal of the American Society of Refrigerating Engineers* to see what effect the width of air space has, and how narrow such hollows must be in order to be "dead" and therefore a benefit rather than

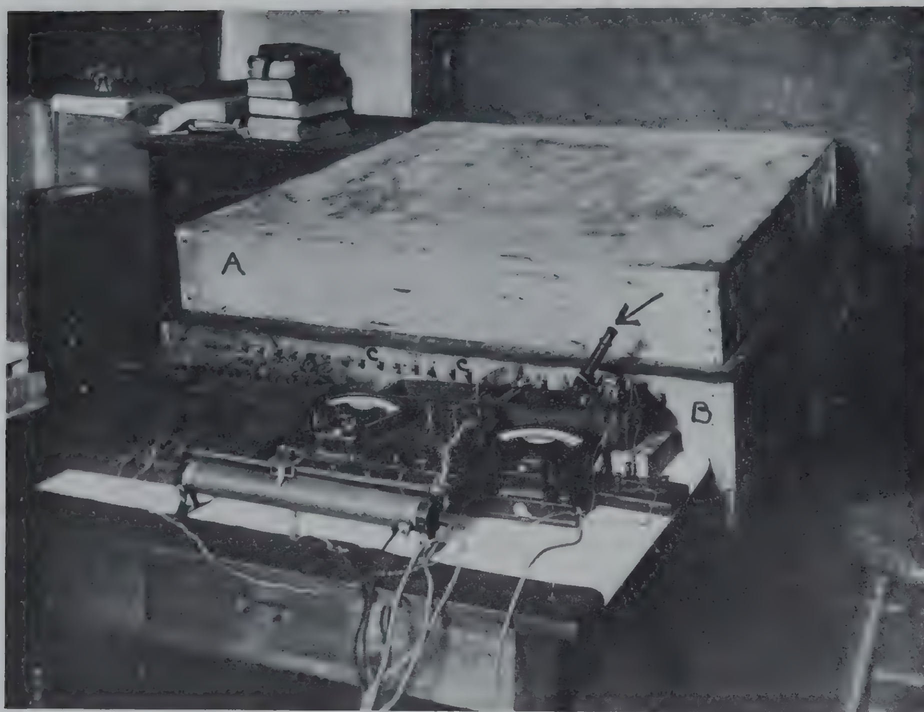


Fig. 1. Layout for thermal conductivity tests, showing sample (A) on insulated box (B), with electrical connections for thermo couples. Arrow points to reading microscope

an actual detriment to insulation. Air itself is a good insulator but it must be so confined that it will not circulate and actually aid in heat loss by carrying the heat of the inside to the outside—"convection."

Under the subject "Testing Thermal Insulators," Dickinson and Van Dusen, of the United States Bureau of Standards, say: "Heat is transmitted from one surface to the other by radiation, air conduction or convection. Convection and conduction are, in the case of vertical air spaces, inextricably connected. Convection depends upon the width of a space, its height and the temperature difference between the boundaries." In comparing one type of wall with another this temperature difference should be figured as the same, because the difference between the outdoor atmosphere and a room at comfortable temperature would be the same if any type of wall were used.

"Important variations of the apparent conduction through air spaces occur with change of width, *although it has often been assumed* that all air spaces have about the same conduction. To represent these changes adequately, a very large number of observations have been made with air spaces of many different widths from 1/16 inch to 3 inches.

"For very narrow spaces, *i.e.*, less than 1 cm. (3/8 inch), the *resistance* to the passage of heat increases almost in proportion to the thickness. Beyond this the resistance increases less rapidly until it reaches a maximum beyond which a *greater* thickness offers *less* resistance to the passage of heat.

"Plain convection plays no appreciable part in the conduction of air spaces of less than 3/8-inch width when 8 inches high. It is a fact, however, as shown by some of our experiments, that a vertical wall made up of two 3/8-inch air spaces, with paper to separate them, gives about the conduction of a similar thickness of cork board."

Or, to quote Prof. J. C. Peebles, of Armour Institute of Technology: "For a given height of air space there is a critical thickness beyond which thermal resistance becomes less and not more. For a height of 8 inches this critical thickness is about ½ inch, while for a height of 2 feet the critical thickness is in the neighborhood of 1 inch."

They then continue to show that the air can be confined, even with paper. But a correct view must be taken, *i.e.*, different from many preconceived notions. Air spaces are not valuable unless of such narrowness that convection is entirely eliminated.

This will suffice for the abstract theory. Let us now describe the exhaustive tests made by Prof. G. F. Gebhardt and Prof. Peebles at Armour Institute of Technology, and analyze them in the light of the scientific reasons for the showings made by the various spaces.

The research was begun to learn the relative value of the metal lath and stucco wall on wood studs to that of other standard fire-resistive walls generally used for stucco. Although it was found that the plain back-plastered wall ranked very high as an insulator and was superior to those which popularly are accorded higher position, the re-

RESULT OF TESTS SHOWING HEAT LOSS CALCULATIONS

Sample No	Base B.t.u. Loss	% added for Flues	B.t.u. Loss when in Vertical Position
1	.31	7½	.333
2	.323	7½	.347
3	.394	7½	.4235
4	.418	7½	.449
5	.413	10	.454
6	.422	7½	.454
7	.510	7½	.548
8	.557	0	.557
9	.510	10	.561
10	.510	15	.586
11	.626	10	.689
12	.508	10	.559
13	.626	15	.719
14	.508	15	.584
15	.642	10	.706
16	.642	15	.738

Fig. 2

search was continued to include various methods of inexpensive extra insulation that are possible of incorporation in the hollow section of the metal lath wall while it is being constructed. The constant heat loss, winter after winter, that is incurred through lack of accurate information is appalling and the information derived from this series of tests, if utilized, can be made to save hundreds of thousands of dollars yearly.

The tests were made on full sized samples of the ordinary run of materials, purchased in the open market. They were all erected in accordance with common trade practice by mechanics in the respective trades and under the supervision of Prof. Peebles and a capable contractor. The stucco was made with Portland cement, and wherever furring or lathing was used on the interior it was always with the same kind of metal lath and with the same thickness of hard wall plaster so that no variation in results could occur on this account. The method of testing was to lay each sample (42 inches square) in turn upon a carefully insulated box which contained a series of electrical heating coils. This is illustrated in Fig. 1.

The entire construction was installed in a room of constant temperature. An electrical current was sent into the coils to produce a temperature of 68° difference between the box and the room,—that is from one side to the other of the wall section. This difference was chosen as representing the same heat difference between a room at 68° and at zero outdoors—the maximum continuous difference in the Northern states and frequently used by heating engineers. This electrical current was measured by instruments and adjusted until the heat difference of 68° was maintained for many hours without necessity of varying the current. The necessary electrical energy in-put represented exactly the heat that was being constantly lost through the wall. This was then reduced to British thermal units (B.t.u.) and then to B.t.u. per square foot of wall, per degree difference in temperature, per

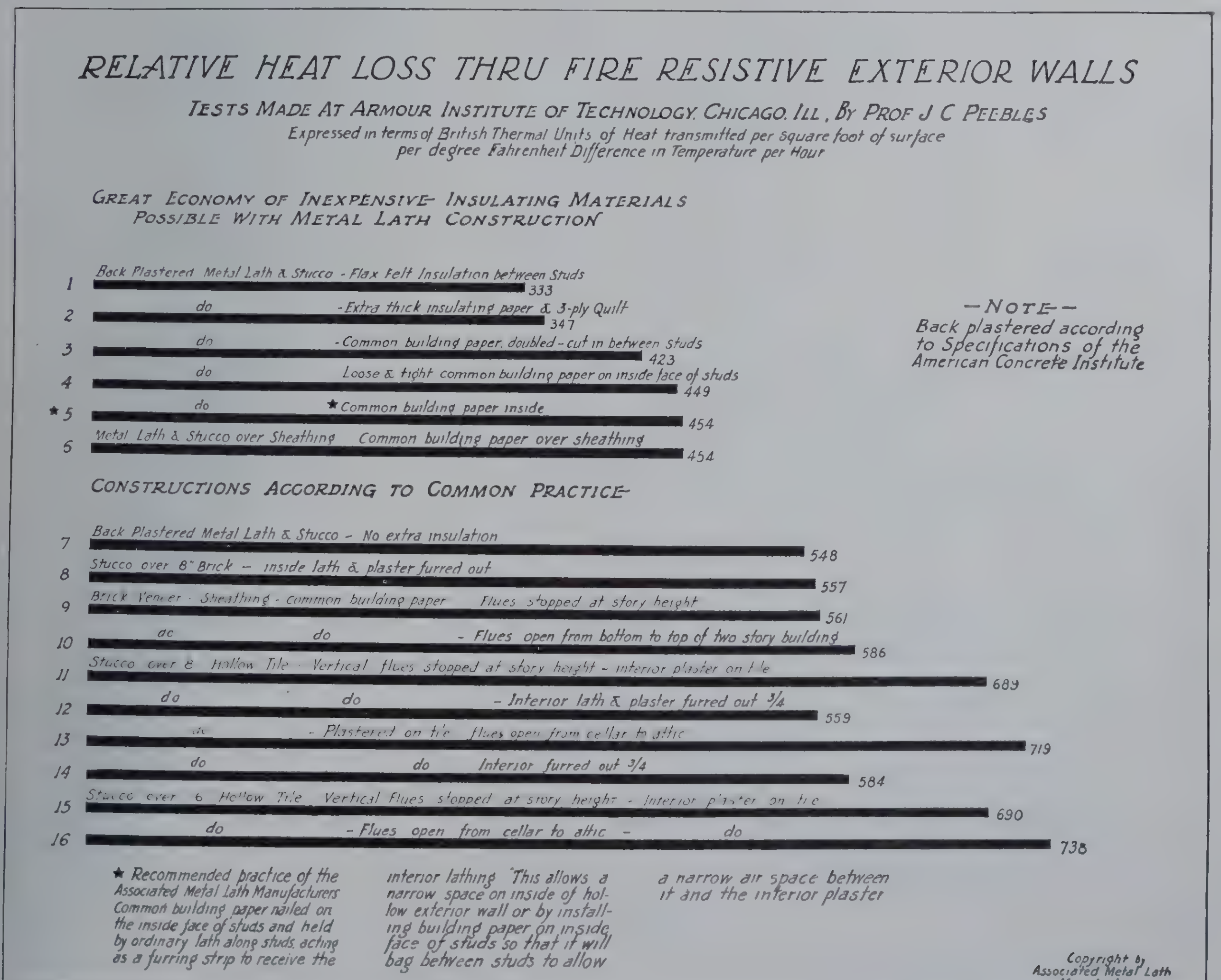


Fig. 3

hour—the time unit upon which all American heating formulæ are based. All samples were similarly tested and recorded for comparison. (See Fig. 2.)

"In discussing these tests which we have made," writes Prof. Peebles, "it seems that the following points may well be emphasized: These figures are not the result of estimates or computations but were obtained from careful experiments, conducted on full sized sections. The circumstances of the tests were such that conditions could be maintained constant throughout. The work was done by experienced investigators who have no interest other than arriving at the facts in the case; therefore, the results must be accepted as a conscientious effort to obtain correct relative figures on the conductivities of the various examples. (See Fig. 3.)

"And now in regard to the conductivity of glass as compared to these walls. Many people seem to have the idea that glass is not a particularly good insulator and that the chief reason it is used in windows is because of its transparency. As a matter of fact, this is far from being the case, as glass is an excellent insulator both thermally and electrically. If this were not the case it would be next to impossible to heat a building having a large proportion of glass surface. Most people familiar with the subject will concede that pure cork board is a good insulator and yet, thickness for thickness, glass is nearly three times as good."

It is well known that overcoating a house with metal lath and Portland cement stucco creates a narrow air space between the overcoating and the original wood siding of the building. Prof. Peebles' tests show that this reduces the conductivity of the exterior wall by 15 7/10%, with a corresponding decrease in the coal bill. This decrease in the coal bill will be approximately 13 3/10% because the wall area takes up about 85% of the total exposure. This 13 3/10% saving is more than enough to pay the interest on the cost of overcoating any house.

Here let it be said that never before has such an exhaustive series of tests been reported and that many of the constants now in use are based upon calculations, or estimated from tests of component parts such as brick, wood, plaster, etc., and must be revised in the light of these tests upon actual construction examples. Even Prof. Peebles writes concerning a quotation from one of his works made prior to these experiments: "The figures given (previously) were the results of estimates only. You are no doubt well aware that there are certain formulæ which the heating engineer uses. . . . However, when these figures were submitted we had conducted no tests upon an 8-inch brick wall. . . . Results quoted (previously) were substantially those obtained from the theoretical formulæ (in present use), and our later experiences in making these tests show that the results were too low. There is no doubt that the same is true for a good many other values for estimated heat flow."

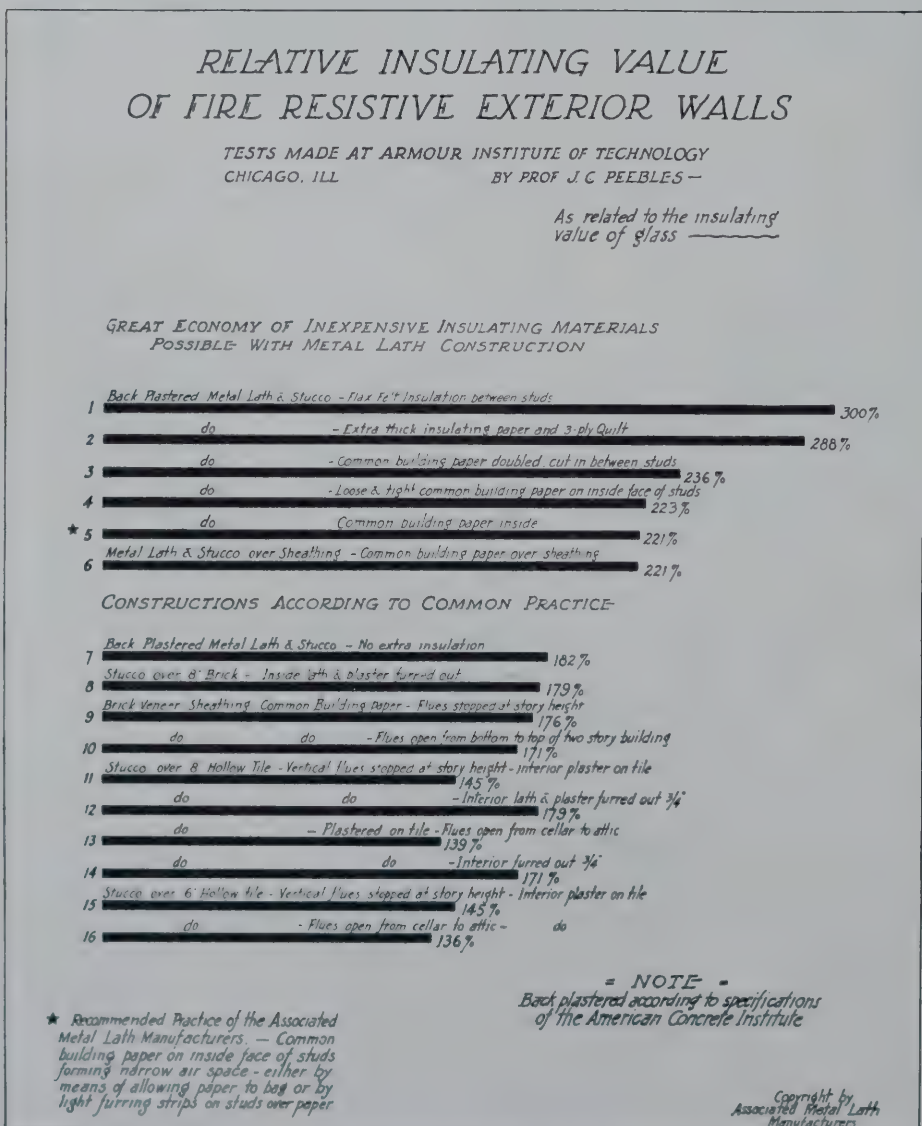


Fig. 4

Every facility for scientific accuracy was given in making these tests and they represent the last word on the subject. They extended over a period of two years and tests were frequently repeated with variations of 2%, but accuracy of about 5% is guaranteed.

"We have neglected the effect of wind on an exposed wall surface, a factor which is difficult to reproduce accurately in an experimental investigation. It is a fact well known to every engineer that even a solid brick wall is porous and permits considerable infiltration of air. This causes an appreciable increase in the conductivity in a wall of such construction. The use, however, of building paper or similar material eliminates this weakness to a considerable extent. The heat insulating properties of paper can be readily utilized in back-plastered stucco construction."

All tests were made, for convenience, in the horizontal position, but enough were made in both horizontal and vertical to correct the readings for vertical positions, and this is the way they are given herewith.

"Any increase in heat flow from conductivity," says Prof. Peebles, "will affect all of the hollow wall types, depending upon the vertical dimension of the air space. Where this distance is approximately 9 feet from floor to ceiling, the increase in heat flow would probably be about 10% over that shown in our tests. If, however, this distance is stopped by a horizontal bracing, which we understand is the recommended practice of the American Concrete Institute and the Associated Metal Lath Manufacturers for back-plastered stucco construction, the increase would probably not exceed 7 or 8%. On the other hand, in certain cases of hollow tile construction with vertical webs (or hollow brick walls) this air space may extend from foundation to attic, in which case the increase may be as much as 15% or more. A better practice would be to use a joist support in which case the vertical flue would be reduced to about 9 feet in height and the increase in heat flow to about 10%.

"The recommended practice of the Associated Metal Lath Manufacturers of laying a strip of metal lath covered with a layer of mortar in every horizontal course of hollow tile will reduce the vertical distance to about 12 inches. In such construction there would probably be but little increase in thermal conductivity over those shown by our tests."

The tiles tested by Prof. Peebles had a single set of cells from face to face in the 6-inch size and a double set in the 8-inch size. In other words, there was no web parallel to the face of the wall in the 6-inch, but there was a web parallel to the wall in the 8-inch tile. The air space in the 8-inch tile, therefore, has two advantages over the 6-inch tile; one is that the air space is narrower, and therefore less convection can set up; the other is that there are two air spaces and therefore the convection set up in air space No. 2 is only affected by the temperature of the interior web and not by the temperature of the exterior web. Thus, there are two good reasons why the 8-inch tile is better than the 6-inch.

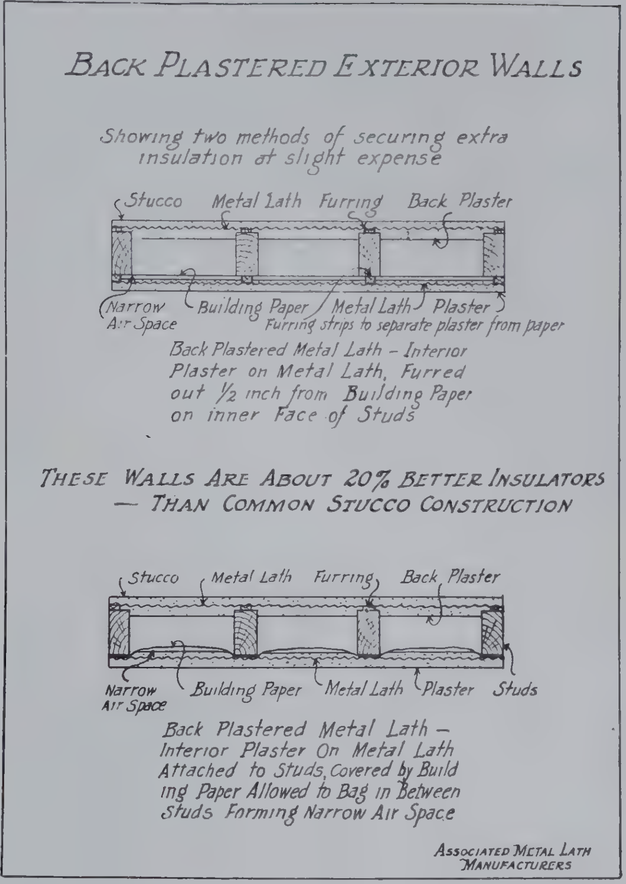


Fig. 5

"The temperature differences used in these tests averaged about 68° Fahr., which is near the maximum for this latitude.

"True thermal conductivity through solid portions of the wall is practically proportional to the temperature difference, but the effect of air circulation in hollow wall increases more rapidly than the temperature difference. It therefore becomes a much more important factor, relatively, at a temperature difference of 68°, say, than it would be at 38°, which is near the mean temperature difference for this latitude.

"The effect of internal air circulation on heat flow is considerably increased if, through structural imperfections, the external air is allowed access to the interior of the wall. It is important, therefore, that the structure be tight and free from cracks, especially at the bottom of the wall."

These different points must be kept constantly in mind to correct preconceived erroneous notions:

1. Heat is transferred in three ways—by conduction, radiation and convection.
2. The loss by simple conduction is chiefly through those members which extend from side to side of the hollow example, such as wood studs or tile webs, and in the solid examples by the entire mass. The loss by this method is proportional as the webs or studs are good or bad conductors. The loss through the shell, such as the stucco in

back-plastered type, or through the faces of tile, is small and about equal.

3. The loss by convection is very serious, and is frequently neglected, as the Bureau of Standards authorities note.
4. There are air spaces which insulate and others which are not as valuable as if solid. The value of different sized air spaces is well illustrated in the case of hollow tile where the large air spaces of the tile wall, when unfurred, show great heat loss, but when furred—producing a small air space between the plaster and tile—the heat loss is brought down to the range of other standard walls. This amply justifies the use of furring on the inside of 6- and 8-inch hollow tile walls, and the preference for one or more dividing webs parallel to the face of the tile.
5. The height of the channel or flue has great importance, if wider than 1 inch. This is well known in connection with chimney construction—the higher the chimney, the greater the movement or draft. Cut down the flue height.
6. If the flue extends from cellar to attic the increased heat loss is proportionally 15%; if stopped off at floor level the increase is 10%; if midway between floor and ceiling, 7½%.
7. The material used in dividing the wall into air spaces is of little consequence, ordinary building paper proving to be one of the best materials when properly placed so that the air spaces are narrow. This is illustrated again by the furring, as the thin plaster is of no great insulating value in itself, unless it acts to confine air in a narrow space.
8. Advantage of the extra insulation of especially manufactured insulating materials can be taken when the walls are hollow, as in the wood frame protected by stucco reinforced with metal lath.

Therefore, to sum up: Exterior walls should be designed for efficiency, like any other structural unit. Wood-studded stucco walls, even without extra insulation, are very efficient, but by the inexpensive device of creating a narrow, 1-inch air space, extra insulation is greatly increased.

This can be accomplished cheaply by either of two methods: (1) Placing common building paper over the inside face of the studs; either nailing ordinary lath over the paper along the studs to act as furring for the interior lath, or (2) installing the paper loosely, allowing the paper to bag into the hollow space, placing the interior lath directly on the paper-covered studs.

How to Use New Figures

Fig. 3 represents the heat loss through exterior walls and it will be noted that the common practices for stucco construction are very close when furring is used on the walls. However, the opportunity of using extra insulation should be taken advantage of more frequently. There is over 200% difference between the heat lost through the back-plastered wall with the flax felt between the studs, and that lost by some of the other standard constructions not susceptible to extra insulation. This is all loss and goes on year after year.

Fig. 4 presents a more graphic illustration as it is given in terms of heat insulation, the best insulated wall being represented by the longest line, and that least insulated by the shortest line. The relation is given as compared with ordinary window glass, which by many experimenters has been recognized to be one B.t.u. per square foot per degree difference in temperature per hour. In other words, the lines represent the relative heat loss as compared with window glass as a base.

Fig. 5 shows the final results of the investigation and illustrates two methods of producing an air space of about 1 inch in back-plastered stucco construction at a minimum of expense. It represents a saving of 20% of heat loss over other common constructions of either hollow or solid masonry walls, and over 34% when masonry walls are not furred.

These rules for calculating heating are frequently used in the United States for a maximum of 80° difference in temperature:

1 foot of radiation for every 300 cubic feet of contents, plus

1 foot of radiation for every 15 square feet net exposed wall surface, plus

1 foot of radiation for every 2 square feet of single glass surface, plus

1 foot of radiation for every 30 square feet of ceiling area for all rooms with plastered ceilings and unheated air space between ceiling and the roof, plus additions for skylights, absence of attics and other incidentals.

These rough and ready rules are based upon ordinary construction with a loss of about .560 B.t.u. The principal reason these rules work out satisfactorily is that even the "careful" architect frequently adds 50% to the heat loss and lets it go at that. With Prof. Peebles' determinations, however, it is possible to substitute in the second part of the formula 1 square foot of radiation for every 12 square feet (instead of 15 square feet) net exposed wall surface, when back-plastered metal lath and stucco is used with building paper on the inside studs, or to substitute 8 9/10 square feet for the 15 square feet if the best insulation, shown in Fig. 2, is used.

Working this out for a large residence in Winnetka, Ill., recently completed, these figures are given:

Wall and exposed ceiling of the top floor	6,622 sq. ft.
Area of glass	1,389 " "
Total exposure	8,011 " "
According to the given rule of thumb there would be:	
1 sq. ft. of heating surface for 15 sq. ft. of wall and roof	440 sq. ft.
1 sq. ft. of heating surface for 12 sq. ft. of glass	695 " "
1 sq. ft. of heating surface for 300 cu. ft. of air	250 " "
Total radiation	1,385 " "
If the heat loss in the walls were cut in half by using the back-plastered construction with the best type of insulation, as against the ordinary, common practice for masonry and other walls tested, deduct	220 sq. ft.
Gross radiation by more scientific construction	1,165 " "
Or a reduction of 16%	
Saving on the cost of installation and cost of boiler, radiation, piping, etc.:—12% of the cost of $4,620	$554.00
Saving on the operation of steam plant in vicinity of Chicago: 3 tons of hard coal for 100 sq. ft. of radiation per heating season;—41½ tons at the present price of $15 per ton	$623.25
16% saving is equivalent to	$99.68 per year
This represents a continuous loss each year, or capitalized at 6%, represents the interest on	$1,670.00

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Steel Design for Buildings

PART III. THE DESIGN OF A PLATE GIRDER

By CHARLES L. SHEDD, C.E.

IN the June number of THE FORUM we discussed the general features of plate girder design. We give here the computations for the design of a single-plate girder which carries a column load of 309,700 pounds and a uniform load of 28,000 pounds on a span of 14 feet and 6 inches. The arrangement of figures for determining the re-

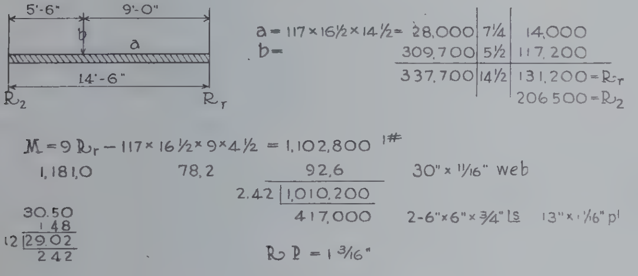


Diagram Showing Application of Figures

actions and bending moment is the same as for those described for beams in the July number.

The greatest reaction is 206,500 pounds which is the maximum shear. It is usual to allow 10,000 pounds per square inch in shear on the gross area of the web. Table I shows the gross areas for various sized webs. Along the top of the table are given various values for "t," the thickness of the web plate, varying by sixteenths of an inch from $\frac{5}{16}''$ to $\frac{7}{8}''$, and for various depths of web plate from 30″ to 60″, varying at intervals of 2″. Plates are most easily obtainable in widths which are multiples of 2″ although intermediate sizes are rolled. A few years ago it was the practice to use the net area of webs, but recent tests have given results which warrant engineers in the use of the gross areas with the usual spacing of rivets. In this case we have chosen a web plate $30'' \times \frac{11}{16}''$ which is good for 206,300, according to the table; this is only one-tenth of 1% less than required, which of course is near enough for practical purposes.

It is generally allowable to use one-eighth of the area of the web with the area of the flange in designing the flanges. Table II gives the values of the same webs as given in Table I for bending. It gives the product of one-eighth of the area of the web, 16,000, and the depth of the web less 3″ which gives the moment of resistance of the web in foot-pounds. This is a little on the safe side in most cases as 3″ is generally more than need be used, as will be seen by Table IV where it is described. The total moment on the girder is 1,102,800 foot-pounds and we can deduct from this the value of the web in bending which we find in Table II to be 92,600 foot-pounds, leaving 1,010,200 foot-pounds to be taken care of by the flange angles and cover plates.

If we assumed that the effective depth of the plate girder was 3″ less than the depth of the web, or 27″ which is 2.25 feet, we can divide the moment remaining by 2.25 on the slide rule to get the flange angles and plates approximately. This division on the slide rule gives about 450,000 as the total flange stress to be taken care of by the angles and cover plates. Table V gives the allowable flange stress for various sections. If we used $6'' \times 6'' \times \frac{3}{4}''$ angles the thickness of the 13″ cover plates would be about $1\frac{1}{4}''$. We can now correct the effective depth by using Table IV. This table gives the distances from the backs of the angles to the centers of gravity of the various flange sections. The effective depth required is the distance between these centers of gravity. The backs of flange angles are usually placed $\frac{1}{2}''$ further apart than the depth of the web plate and in this case would be 30.5″. The trial

GROSS AREA OF WEBS										
d \ t	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8
30"	9.38	11,25	13,13	15.00	16,88	18,75	20.63	22,50	24.38	26.25
32"	10,00	12,00	14,00	16.00	18,00	20,00	22,00	24,00	26,00	28.00
34	10,63	12,75	14.88	17.00	19,13	21,25	23.38	25,50	27,63	29,75
36	11,25	13,50	15,75	18.00	20,25	22.50	24.75	27,00	29,25	31,50
38	11,88	14,25	16,63	19,00	21,38	23,75	26.13	28,50	30,88	33,25
40	12,50	15,00	17,50	20.00	22.50	25.00	27,50	30,00	32,50	35,00
42	13,13	15,75	18,38	21.00	23,63	26,25	28,88	31,50	34.13	36,75
44	13,75	16,50	19,25	22.00	24.75	27,50	30,25	33,00	35,75	38,50
46	14,38	17,25	20,13	23.00	25,88	28,75	31.63	34,50	37,38	40,25
48	15,00	18,00	21,00	24.00	27,00	30,00	33,00	36.00	39,00	42.00
50	15,63	18,75	21,88	25.00	28,13	31,25	34.38	37,50	40,63	43,75
52	16,25	19,50	22,75	26.00	29,25	32,50	35.75	39,00	42,25	44,50
54	16,88	20,25	23,63	27.00	30,38	33,75	37,13	40.50	43,88	47,25
56	17,50	21,00	24,50	28.00	31,50	35,00	38,50	42,00	45,50	49,00
58	18,13	21,75	25,38	29.00	32,63	36,25	39,88	43,50	47,13	50,75
60	18,75	22,50	26,25	30.00	33,75	37,50	41,25	45.00	48,75	52,50

Table I

section which we found gives in Table IV as the distance from the backs of the angles to the center of gravity of the trial flange section .60″ which, multiplied by 2 and deducted from 30.50, would give 29.3″ or 2.44 feet. If we adjust our slide rule so as to use this instead of 2.25 we find that 1 1/16″ cover plates could be used. We can correct the effective depth to check this section and find it to be 2.42 which gives a required flange stress of 417,000 pounds. In Table V the allowable flange stress for this section would be 419,400 pounds, which shows that our section is satisfactory.

We will now describe Table V more fully. The sections given here are all for two 6″x6″ angles with 13″ cover plates or no plates at all. The upper line gives the thickness of the angles, varying by 1/16″ from 3/8″ to 7/8″. Larger than 3/4″ are usually avoided. The second horizontal line gives the gross areas of these angles. The third horizontal line gives the net areas of these angles with one hole deducted for each angle. In this case 3/4″ rivets are used. The hole is actually 1/16″ larger than the rivet before driving and 1/16″ more is allowed for injury of metal, giving 7/8″ to be deducted in all. In 1/2″ angles the area deducted in each angle would therefore be 7/16″ or 7/8″ for two angles which, as the decimal .88, gives the difference between 11.50 the gross area of the angles and 10.62 the net area with one hole deducted in each angle. The fourth horizontal line similarly gives the net areas with two holes deducted. The next line gives the allowable

	1/8 WEB × 16,000 × $\left(\frac{d-3}{12}\right)$										
d	$\frac{d-3}{12}$	t= 5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8
30	2.25	42,2	50,6	59,0	67,4	75,8	84,2	92,6	101,0	109,8	118,0
32	2,42	48,4	58,1	67,8	77,5	87,2	96,8	106,5	116,3	126,0	135,8
34	2.58	54,8	65,8	76,7	87,7	98,6	109,6	120,6	131,5	142,5	153,5
36	2,75	61,8	74,2	86,5	98,9	110,2	123,6	136,0	148,3	160,8	173,0
38	2,92	69,3	83,1	97,0	111,0	125,0	138,8	152,3	166,5	180,1	194,0
40	3,08	77,0	92,4	107,9	123,2	138,8	154,0	169,8	185,0	200,1	216,0
42	3,25	85,2	102,1	119,1	136,0	153,0	170,2	187,5	204,2	221,5	238,2
44	3.42	94,0	112,9	131,8	150,5	169,1	188,0	206,5	226,0	244,1	262,5
46	3,58	102,9	123,4	144,0	164,8	185,2	206,0	226,5	247,5	268,0	288,2
48	3,75	112,5	135,0	157,6	180,0	202,6	225,0	247,5	270,0	292,3	314,5
50	3,92	122,2	146,8	171,1	195,8	220,0	244,5	269,0	294,0	318,0	342,0
52	4.08	132,8	159,0	186,0	212,0	239,0	265,5	292,0	318,0	345,0	372,0
54	4,25	143,2	172,0	200,5	229,5	258,0	286,5	316,0	344,0	372,0	401,0
56	4,42	154,8	185,8	216,2	247,5	278,0	309,5	340,0	371,0	402,0	433,0
58	4,58	166,0	199,2	232,2	266,0	299,0	332,0	365,0	399,0	432,0	465,0
60	4 75	178,2	214,0	250,0	285,0	320,5	356,2	392,0	428,0	463,0	499,0

Table II

	t= 5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	d.s
3/4"φ	4,690	5,630	6,560	7,500	8,440	—	8,840

ALLOWABLE SHEARS FOR VARIOUS R D (d s.) 3/4" RIVETS																			
EFF DEPTH	1 1/8	1 3/16	1 1/4	1 5/16	1 3/8	1 7/16	1 1/2	1 9/16	1 5/8	1 11/16	1 3/4	1 13/16	1 7/8	1 15/16	2	2 1/16	2 1/8	2 3/16	2 1/4
1.3	122.6	116,1	110,3	1.05,1	100,3	95.9	91,9	88,3	84.9	81,7	78,8	76,1	73,5	71.2	69,0	66,9	64,9	63,0	61,3
4	132,0	125,1	118,8	113,2	108,0	103,3	99,0	95,0	91,4	88,0	84.9	81,9	79,2	76,7	74,3	72 0	69,9	67,9	66,0
5	141,4	134,0	127,3	121,2	115.7	110,7	106,1	101,8	97,9	94,3	90,9	87,8	84,9	82 1	79,6	77,1	74,9	72 7	70,7
6	150,9	142,9	135,8	129,3	123,4	118,1	113,2	108,6	104,4	100,6	97,0	93,6	90,5	87,6	84,9	82,3	79,9	77,6	75,4
7	160,3	151,9	144,3	137,4	131,2	125,5	120,2	115,4	111,0	106,9	103,0	99,5	96,2	93,1	90,2	87,4	84,9	82,4	80,1
8	169,7	160,8	152,8	145,5	138,9	132,8	127,3	122,2	117,5	113,2	109,1	105,3	101,8	98,6	95,5	92,6	89,9	87,3	84,9
9	179,2	169,7	161,2	153,6	146,6	140,2	134.4	129,0	124,0	119,4	115,2	111,2	107,5	104,0	100,8	97 7	94,8	92,1	89,6
2.0	188,6	178,7	169,7	161,6	154,3	147,6	141,4	135,8	130,6	125,7	121,2	117,1	113,2	109,5	106,1	102,9	99,8	97,0	94,3
1	198,0	187,6	178,2	169,1	162,0	155,0	148,5	142,6	137,1	132,0	127,3	122,9	118,8	115,0	111,4	108,0	104,8	101,8	99,0
2	207,5	196,5	186,7	177,8	169,7	162,3	155,6	149,4	143,6	138,3	133,4	128,8	124,5	120,5	116,7	113,2	109,8	106,7	103,7
3	216,9	205,5	195,2	185,9	177,4	169,7	162 7	156,1	150,1	144,6	139,4	134,6	130,1	125,9	122,0	118,3	114,8	111,5	108,4
4	226,3	214,4	203,7	194,0	185,2	177,1	169,7	162,9	156,7	150,9	145,5	140,5	135,8	131,4	127,3	123,4	119,8	116,4	113,2
5	235,8	223,3	212,2	202,1	192,9	184,5	176,8	169,7	163,2	157,2	151,5	146,3	141,4	136,9	132,6	128,6	124,8	121,2	117,9
6	245,2	232,3	220,6	210,1	200,6	191,9	183,9	176,5	169,7	163,4	157,6	152,2	147,1	142,4	137,9	133,7	129,8	126,1	122,6
7	254,6	241,2	229,1	218,2	208,3	199,2	190,9	183,3	176,3	169,7	163,7	158,0	152,8	147,8	143,2	138,9	134,8	130,9	127,3
8	264,0	250,1	237,6	226,3	216,0	206,6	198,0	190,1	182,8	176,0	169,7	163,9	158,4	153,3	148,5	144,0	139,8	135,8	132,0
9	273,5	259,1	246,1	234,4	223,7	214,0	205,1	196,9	189,3	182,3	175,8	169 7	164 1	158,8	153,8	149,2	144,8	140,6	136,7
3.0	282,9	268,0	254,6	242,5	231,4	221,4	212,2	203,7	195,8	188,6	181,9	175,6	169 7	164,3	159,1	154,3	149,8	145,5	141,4
1	292,3	276,9	263,1	250,6	239,2	228,8	219,2	210,5	202,4	194,9	187,9	181,4	175,4	169 7	164,4	159,4	154,8	150,3	146,2
2	301,8	285,9	271,6	258,6	246,9	236,1	226,3	217,3	208,9	201,2	194,0	187,3	181,0	175 2	169,1	164,6	159,7	155,2	150,9
3	311,2	294,8	280,1	266,7	254,6	243,5	233,4	224,0	215,4	207,4	200,0	193,1	186,7	180,7	175,0	169 7	164,7	160,0	155,6
4	320,6	303,7	288,5	274,8	262,3	250,9	240,4	230,8	222,0	213,7	206,1	199,0	192,4	186,2	180,3	174,9	169,7	164,9	160,3
5	330,0	312,7	297,0	282,9	270,0	258,3	247,5	237,6	228,5	220,0	212,2	204,8	198,0	191,6	185,6	180,0	174,7	169,7	165,0
6	339,5	321,6	305,5	291,0	277,7	265,7	254,6	244,4	235,0	226,3	218,2	210,7	203,7	197,1	190,9	185,2	179,7	174,6	169,7
7	348,9	330,5	314,0	299,0	285,5	273,0	261,7	251,2	241,5	232,6	224,3	216,5	209,3	202,6	196,2	190,3	184,7	179,4	174,0
8	358,3	339,5	322,5	307,1	293,2	280,4	268,7	258,0	248,1	238,9	230,3	222,4	215,0	208,1	201,6	195,4	189,7	184,3	179,2
9	367,8	348,4	331,0	315,2	300,9	287,8	275,8	269,8	254,6	245,2	236,4	228,3	220,6	213,5	206,9	200,6	194,7	189,1	183,9
4.0	377,2	357,3	339,5	323,3	308,6	295,2	282,9	271,6	261,1	251,4	242,5	234 1	226,3	219,0	212,2	205,7	199,7	194,0	188,6
1	386,6	366,3	347,9	331,4	316,3	302,6	290,0	278,4	267,6	257,7	248,5	240,0	232,0	224,5	217,5	210,9	204,7	198,8	193,3
2	396,0	375,2	356,4	339,5	324,0	309,9	297,0	285,1	274,2	264,0	254,6	245,8	237,6	230,0	222,8	216,0	209,7	203,7	198,0
3	405,5	384,1	364,9	347,5	331,7	317,3	304,1	291,9	280,7	270,3	260,7	251,7	243,3	235,4	228,1	221,2	214,7	208,5	202 7
4	414,9	393,1	373,4	355,6	339,5	324,7	311,2	298,7	287,2	276,6	266,7	257,5	248,9	240,9	233,4	226,3	219,6	213,4	207,4
5	424,3	402,0	381,9	363,7	347,2	332,1	318,2	305,5	293,8	282,9	272,8	263,4	254,6	246,4	238,7	231,4	224,6	218,2	212,2
6	433,8	410,9	390,4	371,8	354,9	339,5	325,3	312,3	300,3	289,2	278,8	269,2	260,2	251,9	244,0	236,6	229,6	223,1	216,9
7	443 2	419,9	398,9	379,9	362,6	346,8	332,4	319,1	306,8	295,5	284,9	275,1	265,9	257,3	249,3	241,7	234,6	227,9	221,6
8	452,6	428,8	407,3	387,9	370,3	354,2	339,5	325,9	313,3	301,7	291,0	280,9	271,6	262,8	254,6	246,9	239,6	232,8	226,3
9	462 1	437,7	415,8	396,0	378,0	361,6	346,5	332,7	319,9	308,0	297,0	286,8	277,2	268,3	259,9	252,0	244,6	237,6	231,0
5 0	472,0	446,7	424,3	404,1	385,7	369,0	353,6	339,5	326,4	314,3	303,1	292,6	282,9	273,8	265,2	257,2	249,6	242,5	235,7

Table III

flange stresses with no cover plates, which are obtained by multiplying the net areas with one hole deducted by 16,000, the allowable stress per square inch. The columns below give the allowable stresses in a similar manner for these same angles with cover plates, which are obtained by adding the net areas of the angles with two holes out to the net areas of the cover plates and multiplying by 16,000. These of course are the allowable flange stresses for the tension flanges. This, as we have noted, is the usual limiting feature in the design of a flange.

The rivet pitch should always be determined and not left until later as it is frequently found that this rivet pitch is so small that the material would be injured by the holes being too near together. This can be determined from Table III. This gives the various allowable shears for pitches varying by 1/16" from 1 1/8" to 2 1/4" for various effective depths, varying by 1/10 foot from 1.3 to 5 feet, for 3/4" rivets in double shear. The rivets are in double shear if the thickness of the web is 5/8" or more. Along the top of the table will be found various values for 3/4" rivets in bearing on webs of different thickness and also for double shear. If the thickness of the web is less than 5/8" the value of the allowable shear in the table should be reduced by dividing by the value of a rivet in double shear (8,840) and multiplying by the value of the rivet in bearing on the web used. With an effective depth of 2.4 we find that a rivet pitch of 1 3/16" is good for 214,400 shear, which is a little greater than the 206,500 shear on the girder. If necessary this required shear may be reduced by taking into account that part of the moment which is taken by the web. This is usually not done, however. If the uniform load were applied to the flange this also would have to be taken into account as the shear on the rivet would then be the resultant of the vertical shear from the uniform load and the horizontal shear due to the flange stress in the girder.

Table III is derived from the formula:

$$p=\frac{Vd}{S}$$

where V is the value of one rivet in double shear or bearing as the case may be, d is the effective depth in inches, and S the shear at the point on the girder where the rivet pitch, p, is required. When the uniform load is applied directly to one of the flanges this formula should be modified by substituting for S the quantity $\sqrt{S^2+a^2d^2}$, where a is the uniform load per lineal inch of girder.

When it becomes necessary to figure the rivet pitch closer than is given by these formulæ by taking into account the portion of the bending taken by the web, we may increase the rivet pitch obtained by the formula just given by using the formula:

$$\frac{A+a}{A}p=p'$$

where A is the area of the flange angles and plates, a the area of one-eighth of the web, and p' the revised rivet pitch.

This is as far as it is necessary for the designer to go as the detailer in the shop can take care of the rest of the design if the loading is given him. It is possible, however, for the estimator to figure

BACK OF Ls TO C G FLANGE (INCHES)																			
t OF PLS			0	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 1/2"	1 5/8"	1 3/4"	1 7/8"	2"	2 1/8"	2 1/4"
6"×6" Ls	13" PLS.	3/8	1 64	.98	84	71	57	.47	.36	27	17	08	-01	-08	-13	-25	-.33	-41	-.49
		7/16	1 66	1.05	91	79	65	55	44	35	25	16	07	00	-05	-17	-25	-33	-41
		1/2	1 68	1.12	98	·86	73	63	52	43	33	.24	15	.07	-.02	-10	-18	-26	-34
		9/16	1.71	1.18	1.05	93	80	70	·60	·50	40	·31	23	14	06	-.03	-.11	-.19	-.27
		5/8	1.73	1.24	1 11	99	87	.77	67	57	47	·38	30	21	13	04	-04	-12	-.20
		11/16	1 75	1 29	1 16	1 04	93	·83	73	63	54	45	36	28	19	10	03	-05	-13
		3/4	1.78	1.34	1·21	1 10	99	89	79	69	60	51	42	34	25	16	09	01	-07
		13/16	1.80	1.38	1·26	1 15	1.04	·94	.84	75	66	·57	48	40	·31	33	15	·07	-01
		7/8	1.82	1.42	1.30	1·19	1 09	99	·89	80	71	62	54	45	·37	·29	·21	·13	·05

Table IV

ALLOWABLE FLANGE · STRESSES									
2-6"×6" Ls	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"
Gross A	8.72	10.12	11 50	12·86	14·22	15 56	16·88	18 18	19 46
Net A	8·06	9. 36	10.62	11 88	13 12	14 36	15·56	16·76	17·92
do 2h	7·40	8 58	9.74	10·90	12 04	13 16	14·26	15 34	16 40
Flg St No Pls	129,0	149,8	170,0	190,0	210,0	229,8	249,0	268,2	286,8
13"×5/16"	174,6	193,4	212,0	230,6	248,8	266,8	284,4	301,6	318,6
3/8	185,9	204,7	223,3	241,9	260,1	278,1	295,7	312,9	329,9
7/16	197,1	215,9	234,5	253,1	271,3	289,3	306,9	324,1	341,1
1/2	208,4	227,2	245,8	264,4	282,6	300,6	318,2	335,4	352,4
9/16	219,6	238,4	257,0	275,6	293,8	311,8	329,4	346,6	363,6
5/8	230,9	249,7	268,3	286,9	305,1	323,1	340,7	357,9	374,9
11/16	242,1	260,9	279,5	298,1	316,3	334,3	351,9	369,1	386,1
3/4	253,4	272,2	290,8	309,4	327,6	345,6	363,2	380,4	397,4
13/16	264,6	283,4	302,0	320,6	338,8	356,8	374,4	391,6	408,6
7/8	275,9	294,7	313,3	331,9	350,1	368,1	385,7	402,9	419,9
15/16	287,1	305,9	324,5	343,1	361,3	379,3	396,9	414,1	431,1
1	298,4	317,2	335,8	354,4	372,6	390,6	408,2	425,4	442,4
1 1/16	309,6	328,4	347,0	365,6	383,8	401,8	419,4	436,6	453,6
1 1/8	320,9	339,7	358,3	376,9	395,1	413,1	430,7	447,9	464,9
1 3/16	332,1	350,9	369,5	388,1	406,3	424,3	441,9	459,1	476,1
1 1/4	343,4	362,2	380,8	399,4	417,6	435,6	453,2	470,4	487,4
1 5/16	354,6	373,4	392,0	410,6	428,8	446,8	464,4	481,6	498,6
1 3/8	365,9	384,7	403,3	421,9	440,1	458,1	475,7	492,9	509,9
1 7/16	377,1	395,9	414,5	433,1	451,3	469,3	486,9	504,1	521,1
1 1/2	388,4	407,2	425,8	444,4	462,6	480,6	498,2	515,4	532,4
1 9/16	399,6	418,4	437,0	455,6	473,8	491,8	509,4	526,6	543,6
1 5/8	410,9	429,7	448,3	466,9	485,1	503,1	520,7	537,9	554,9
1 11/16	422,1	440,9	459,5	478,1	496,3	514,3	531,9	549,1	566,1
1 3/4	433,4	452,2	470,8	489,4	507,6	525,6	543,2	560,4	577,4
1 13/16	444,6	463,4	482,0	500,6	518,8	536,8	554,4	571,6	588,6
1 7/8	455,9	474,7	493,3	511,9	530,1	548,1	565,7	582,9	599,9
1 15/16	467,1	485,9	504,5	523,1	541,3	559,3	576,9	594,1	611,1
2	478,4	497,2	515,8	534,4	552,6	570,6	588,2	605,4	622,4
2 1/16	489,6	508,4	527,0	545,6	563,8	581,8	599,4	616,6	633,6
2 1/8	500,9	519,7	538,3	556,9	575,1	593,1	610,7	627,9	644,9
2 3/16	512,1	530,9	549,5	568,1	586,3	604,3	621,9	639,1	656,1
2 1/4	523,4	542,2	560,8	579,4	597,6	615,6	633,2	650,4	667,4

Table V

closer if more information is given, especially the lengths of the cover plates.

We found that $1\frac{1}{16}''$ of cover plates was required. It is customary to use at least $\frac{3}{8}''$ plates and not over $\frac{3}{4}''$. In this case a $\frac{1}{2}''$ and a $\frac{9}{16}''$ plate could be used, placing the $\frac{1}{2}''$ plate next to the angles. To find the point where we can cut off these plates we must find what the strength of the girder would be with the $\frac{9}{16}''$ plate omitted, and also with both plates omitted. If both plates were omitted we would have left at that point the two angles with two holes out of each and the web plate to resist bending. This moment of resistance would therefore equal 14.26x16,000x2.42 + 92,600, or 644,600.

The moment of resistance of the girder with only the angles and $\frac{1}{2}''$ plate can be found by looking up the allowable stress in the flange in Table V and multiplying it by the effective depth: thus, 318,200x2.42+92,600=863,600.

We must now find the moment on the girder at various points and interpolate between them to find the point where we can drop off the cover plates.

The moments on the girder at 5, 6, 7 and 8 feet from the right hand reaction are found thus:

$$5R_r - 117\text{x}16\tfrac{1}{2}\text{x}5\text{x}2\tfrac{1}{2} = 631{,}800$$
$$6R_r - 117\text{x}16\tfrac{1}{2}\text{x}6\text{x}3 = 751{,}300$$
$$7R_r - 117\text{x}16\tfrac{1}{2}\text{x}7\text{x}3\tfrac{1}{2} = 972{,}800$$
$$8R_r - 117\text{x}16\tfrac{1}{2}\text{x}8\text{x}4 = 988{,}100$$

By interpolation we find that both plates can be omitted 5′ 1″ from the right hand reaction, and the $\frac{9}{16}''$ plate can be omitted 6′ 6″ from the right hand reaction. It is good practice to run the plates slightly beyond these points so as to get in enough rivets before the point is reached to enable the plates to do their work. It is common practice therefore to extend the plates about 1′ 3″ beyond the theoretical points of cut-off.

In a similar way we may find the moment on the girder at points 3, 4 and 5 feet from the left hand end, thus:

$$3R_l - 117\text{x}16\tfrac{1}{2}\text{x}3\text{x}1\tfrac{1}{2} = 611{,}300$$
$$4R_l - 117\text{x}16\tfrac{1}{2}\text{x}4\text{x}2 = 811{,}600$$
$$5R_l - 117\text{x}16\tfrac{1}{2}\text{x}5\text{x}2\tfrac{1}{2} = 1{,}008{,}300$$

By interpolation we find the cut-off of the plates to be 3′ 2″ and 4′ 3″ from the left hand end. Therefore the $\frac{9}{16}''$ plates will be 6′ 3″ long and the $\frac{1}{2}''$ plates 8′ 9″ long.

The rivets in the stiffeners over the end columns and under the middle column will be in double shear and be worth 8,840# each. By dividing the reactions and column load each by this value we obtain the number of rivets required in the stiffeners in each case, thus:

$$309{,}700 \div 8{,}840 = 35$$
$$131{,}200 \div 8{,}840 = 15$$
$$206{,}500 \div 8{,}840 = 24$$

The stiffener angles themselves are designed as small columns having an unsupported length equal to half the depth of the girder, which in this case would be only 15″. From a table of two angle struts we may pick out the required sizes for these angles.

The web of the girder we designed as 30″ deep while the angles for the flanges had 6″ legs which would leave $18\frac{1}{2}''$ in the clear between the angles. If the rivets were spaced $2\frac{1}{2}''$ apart we could only get 7 rivets in a line between the flange angles, which with two in each angle would give 11 in each stiffener. Therefore under the middle column we would have to have at least three lines of rivets. To make these symmetrical we would use four lines or eight angles in all for stiffeners. This could be done by using eight 5 x $3\frac{1}{2}$ x $\frac{3}{8}''$ angles.

If the girder was placed on the tops of the columns which carried it and they carried no other load we can design the end stiffeners from the data already used. We will use two angles at the extreme end and four over the inside of the column similar to those shown in the June number of the THE FORUM. The two end angles we will design to carry one-half of the load while the two inside angles will be designed to carry two-thirds of the load. One-half of the left hand reaction is 103,250, which will require two 5x$3\frac{1}{2}$x$\frac{9}{16}$ Ls, while two-thirds of the reaction would be 138,000 which would require four 5x$3\frac{1}{2}$x$\frac{3}{8}$ Ls. At the other end one-half of the reaction would be 65,600 which would require two 5x$3\frac{1}{2}$x$\frac{3}{8}$ Ls, and two-thirds of the reaction would be 87,300 which would require four 4x3x$\frac{5}{16}$ Ls, or we could use only two 5x$3\frac{1}{2}$x$\frac{7}{16}$ Ls. It is often preferred in shops to use fewer sizes than this and to throw away a small amount of material for the sake of the uniformity and simplicity of the shopwork, and this is regarded as good practice.

As we noted in the June number, there are a great many rules as to the use and spacing of intermediate stiffener angles. One rule is that when the depth of the web between flange angles (in this case $18\frac{1}{2}''$) is more than 60 times the thickness of the web (in this case only 27) then stiffener angles must be used and they cannot be spaced over 6 feet apart even if the formula gives a greater distance. The formula for this distance is:

$$d - \frac{t}{40}(12{,}000 - s)$$

where d is the spacing required in inches, t the thickness of the web in inches, and s the shear on the web in pounds per square inch. This formula is conservative and safe to use. If for any reason it is inadvisable to use as small a spacing of the stiffener angles and this distance is not over the maximum 6 feet allowed, we can increase the distance between them by increasing the thickness of the web, which would of course decrease the shear per square inch.

Modern Floor Coverings

PART III

By E. H. HOWARD

IN the discussion of composition floors the type made of magnesium salts was mentioned; it would not be sufficient, however, to refer to this type of flooring merely "en passant." It has in many instances furnished a floor covering which has won it a place in the catalog of materials worthy of full consideration where a durable, sanitary, inert surface is required. The color possibilities and pattern arrangements offer a wide field for study. Laying it in squares with surrounding lines of another color, is one effective method of using this composition. The colors are permanent, if properly used, and can be varied in the mixing to match almost any shade. In the standard colors the red is the most likely to give trouble, and that only by slowly fading.

There is now in the process of development still another variant of the magnesium floor covering. It is not yet on the market, commercially, but it has been tested by many months of actual hard wear. This material is a combination of magnesium salts, from which the chlorides are entirely absent, and ground cork. Possessing as it does the inertness and durability of magnesium compositions, with the resilience and sound-proof qualities of cork, it merits attention.

The cork is ground, not pulverized, and mixed with the magnesium salt in a plastic mass. To this is added the color pigment, which, by the way, does not color the cork, and when the whole mass is of the proper consistency it is placed in moulds under high pressure and cured. After being cured, the moulds are removed and the material is cut into tiles and ready to lay. These tiles have been used for trucking surfaces and so far have developed no defects. The surface is non-absorbent, so that grease does not penetrate, and washing with any cleanser or soap will thoroughly clean the surface.

They may be cemented directly to concrete with a waterproof cement or may be laid on a wood floor. When the under surface is wood there should be a layer of coarse cloth tacked to the wood floor, and to this the tile is attached by means of a special quick-setting cement. The cloth serves merely as a protection in case of shrinkage in the wood. This material may be used in large sheets as well as in small tile, and therefore can be used as a dado on the wall. It is also possible to use it in the form of a sanitary base.

There is still another form of floor covering which is made in colors, patterns, shapes and sizes to suit the designer's requirements. The foundation and principal component is cement. All architects are familiar with the cement tile which was on the market a few years ago. It was not a material to appeal, excepting in occasional low cost work. The tile we are now considering is, however, far different and should not be confused with the old cement tile.

Without doubt, it will be a surprise to many to know that some of the fine "old" Spanish tile floors which are seen in some of the southern estates and in Cuba are manufactured of modern cement.

Panel of Simple Pattern Showing Veining

Decorative Rubber Flooring in Piano Warerooms of C. C. Harvey Co., Boston

Kilham, Hopkins & Greeley, Architects

This new product, having the appearance of marble, can be employed in varied architectural patterns and is noiseless and resilient under foot

Cement Tile Floor in Pasaje Hotel, Havana, Cuba
Each unit is composed of four similar tile

The illustrations presented here will give an idea of the great opportunities for securing fine copies of old tile and the wide variety of color and design which are at the command of the architect or engineer, if he elects to employ this type of floor. Cement floor tile* is no new product, nor is it a material which has not proved its value in the test of time. There are in Havana today some floors which are as tight and flush as new work, but which have been laid and used for over 125 years.

Cement tile is simple in manufacture but requires skilled artisans to make the designs in the tile in proper manner. Steel moulds are used and this assures even sizes, true forms and square edges. The moulds are filled with cement and the designs are pressed in. The tile is then subjected to a pressure of 4,500 pounds to the square inch. The tiles are "seasoned" with water and are then "cured" for a definite time, depending on the size and character of mixture, in a storage room kept at a fixed temperature. The whole process results in an exceedingly dense, compact, hard substance, not subject to action of heat or cold and free from danger of swelling or shrinkage.

If the tile is to be laid on a concrete floor the concrete should be kept about two inches below the finished surface. The structural floor should be smooth, but not steel troweled. Upon this under surface is laid the tile bed of approximately 1⅛ inches of cement mortar, and then the finished product is placed in position. From this point the process of laying the floor is the same as for ordinary tile. After the floor has been thoroughly washed a light coat of floor wax is applied and wiped off with a cloth. One more wax treatment six months later is recommended as all the finish the floor will need to give a fine, hard sheen.

Floor coverings play so vital a part in modern construction that an exhaustive study of the characteristics of the various materials is of great importance. Linoleum, cork carpet, cork tile, rubber tile, synthetic rubber and composition floors have been discussed and presented in a manner, but not so thoroughly as the subjects deserve. The analysis, however, will tend to give the architect a starting point for his own personal investigations. Facts have been presented which may at times be at variance with the salesman's talk, but facts are unalterable.

In reality there is little need of expressing the truism that a floor may make or mar an otherwise beautiful room. It is obvious. The profession has been interested in trying to secure something for floors which would be "wear-proof," noiseless, artistic, sanitary, easily cleaned and of low maintenance cost. We cannot prophesy what shall be in future, but one can easily look back and note the progress that has been made in the last decade and hope, perhaps not in vain, that the future will bring us a material which will be even superior to those we now possess.

There is a vast field opened up in the supplying of materials suitable for flooring of buildings of different kinds, for substances of various sorts are required for buildings serving different uses. The ingenuity of modern manufacturers may be relied upon to meet the demand and the market offers a range of materials broad enough to fulfill the need of flooring suited for different purposes. The adaptability of the floor coverings which have been described in these pages is the reason for much of their popularity, for they are to be had in units of such flexibility that they may be laid without difficulty.

Cement Tile Floor in National Bank of Cuba

*We are indebted to Mr. A. L. Hutchinson, architect, of Mobile, Ala., for some of the data on the cement tile and for the illustrations included here.

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Straight Talks with Architects

I. HOW CAN I GET MORE BUSINESS IN MY OFFICE *NOW?*

THE other day a good friend of ours came into the New York office of THE FORUM. He is not an architect; as a matter of fact he is the owner of a department store in one of the smaller cities near New York. He brought with him, however, certain suggestions regarding business getting which should be of practical value to every architect.

It happens that his interest in architecture is confined to the building of a residence, for the planning of which he retained an architect about two years ago. His experience in this problem of building a home was similar to that of many architects' clients who hoped to build in 1920. After the plans were completed and bids taken he found that the house would cost him eight or ten thousand dollars more than he was willing to spend. After making certain of the cost, he refused to build. Naturally this was a disappointment to the architect, and the plans for this house were filed away, with many others, in the hope that a happy day would come when costs would be low enough to meet the clients' approval.

About a month ago an enterprising sub-contractor (who had figured this contract a year before) visited the architect's office and asked if there was any chance to re-figure it. The architect told him that there was no chance. Spurred on by a need of work, however, this sub-contractor went to the owner and told him that he would like to re-figure his part of the work, as he felt that a substantial saving might be made over last year's bid. When the owner asked him why he thought this might be the case now, the sub-contractor replied that there were several reasons, among them being:

1. Somewhat lower prevailing prices for materials.
2. Possibility of securing the right kind of mechanics.
3. The increase of efficiency of workmen in the building trades.
4. The market for both labor and materials being steadier, and it not being necessary to add any large contingency fee.

The prospective owner of the house, being a shrewd buyer, realized the soundness of these reasons and told the sub-contractor that he would be glad to have a new figure, although he felt that it would probably be a waste of time. Much to his surprise, however, the figure which came in showed a really substantial reduction in costs. Convinced that this condition might bear investigating the owner went to his architect and instructed him to get both general contract and sub-contract figures from the same firms or individuals who had figured before. The net result (to the surprise of both owner and architect) was that where the cost of this house last year totaled approximately $30,000, the same house this year would cost less than $22,000. On this basis the owner was willing to proceed and the house is now under construction.

It may be noted here that the architect's eyes were opened and that he proceeded at once to give these figures to two or three of his clients who for some time had been talking about building new residences. The net result has been that two other contracts have been awarded from the office of that architect. Certainly no credit is due to this particular architect for possessing an instinct for the development of business. It took an insistent sub-contractor and a keen merchant to anticipate and recognize conditions of which the architect himself should have been cognizant.

This will explain the attitude of the merchant in question who, when we had told him that business was slow in most architects' offices just now, replied in no uncertain terms that if, from a sales viewpoint, he ran his department store in the way that most architects conduct their businesses he could not pay interest on the mortgage. We could not help but recognize the truth of his statement and into our minds there came the memory of a question asked by a capable architect just a few days before—the question which constitutes the heading of this article. It was asked in a tone of pathetic hopelessness, as much as to say, "of course you cannot tell me."

It is true that we cannot tell any architect exactly where to go in order to get a new commission today. We know, however, that certain architects' offices *are* busy and we know *why* they are busy. In most cases it has not been luck or a fortunate social connection, but it has been the attitude so well expressed in the slogan, "1921 Will Reward Fighters." These architects who are fortunate enough to be busy have kept closely in touch with market conditions; they have noted the increasing efficiency of labor in the building construction field and they have analyzed the business needs of their clients and have spread wide a drag-net for

sub-contractors' figures, which have in many cases been much lower than those quoted in the average market figures—lower, in fact, than the architects themselves had anticipated.

Now, in the episode of the merchant and his house, the ideal condition would have been that the architect himself might have ferreted out the fact that this house could be built for a substantially lower price. According to this ideal he would have brought this fact to the attention of his client, whereupon he would have received an order to proceed with the work.

Why did he not think of doing this?

Why is it that, with so many possible building projects in view, the average architect is content to spend his time damning conditions in the building industry, when perhaps in his office there are tentative plans or projects which would proceed immediately if the architect used the right tactics with the owners?

When the average architect reads these statements he may probably sit back and say, "Oh well, it is easy enough for a writer to tell about these things, but it is not practicable to do them." We believe that the principal reason that architects as a rule are not good business getters, and consequently are usually numbered among those "who wait to be called," is because the average architect does not appreciate the fundamental business conditions which affect the building industry. Consequently, when a client tells him that he is waiting for prices to go back to pre-war levels the architect can only sigh and hope for the happy day when building costs will reach the levels of the depressed period of 1913.

On the other hand, we believe that practically every architect is receptive to ideas, particularly at this time when every office needs more business. Therefore a review of the general conditions, showing the trend of building construction costs and the important facts affecting the stabilization of material and labor prices, should prove valuable data in discussing building conditions with clients.

The only way that the so-called buyers' strike in the building field can be broken is for every architect to enlist himself actively in disseminating the market information which the prospective building owner should have. THE ARCHITECTURAL FORUM feels this condition so strongly that at the present writing a questionnaire is being sent to every architect in the United States asking him for a list of the number of possible projects which are dormant in his office because of this same buyers' strike. The information thus obtained is to be used in the proper channels to help correct false impressions as to building activities when market conditions become more stabilized.

Only the architect, however, has opportunity for the necessary contact with his clients who, in sum total, make up his division of the building field, and it is certainly the architect's duty to acquaint himself in every possible manner with conditions of building costs in order that he may discuss this question definitely and intelligently with his clients when they are seriously considering the advisability of building.

A review of the facts as to present and future conditions in the building industry may in a sense be termed "dry reading," but at the same time this is the sort of information which any architect can use and which, if it does not result in the development of immediate work, will certainly impress the prospective client with the fact that the architect is giving careful consideration to his problems and business interests.

From several sources it is learned that the average cost of building construction is today about 100% higher than in 1913, which is usually referred to as the pre-war period. The index figure of wholesale prices of building materials, as prepared by the United States Department of Labor, indicated for July, 1921, a figure of 200 as compared to a figure of 100 in 1913 and 333 in July of 1920. In other words, the average cost of building materials has come down more than half way from the peak to the pre-war level. It may be noted also that the *Engineering News-Record* has recently developed an interesting method of figuring an index figure of construction cost. Briefly, this is done by taking the total annual production of steel, lumber and cement, together with the total number and wage of common laborers in the United States, exclusive of farm laborers. To convert these factors into terms of money, 1913 was selected as the base whereby index figures were prepared for every year following, using the material prices quoted at the given time together with the average number and wage of common laborers in 20 representative cities. A careful study was made of the relative quantities of these materials and amount of labor used in construction work, and this basic index figure was then developed:

2,500 lbs. structural steel, $1.50 per 100 lbs.	$37.50
6 bbls. cement, $1.19	7.14
600 ft. b. m. pine, $28.50	17.10
200 man-hours, $.19	38.00
	$99.74

The index figures of construction development in this manner since 1913 are:

1913	$99.74
1914	92.99
1915	98.26
1916	137.29
1917	189.02
1918	202.77
1919	207.81
1920	238.79
1921 (7 months)	214.39
July, 1921	194.82

This index figure of July, 1921 also shows approximately 100% higher cost of construction than in 1913.

We may introduce at this point, however, the question as to whether it is fair to take the construction cost of 1913 as a pre-war level and expect building costs to come back close to this figure before there will be any general resumption of

building activity. R. C. Marshall, Jr., General Manager of the Associated General Contractors, has given careful study to this matter. It is his opinion that the building costs of 1913 and 1914 do not constitute a normal price level. He declares that for 20 years prior to the world war all wholesale prices were steadily increasing at the rate of about 2½% a year and that this increase, except for the war, in all probability would have passed the so-called normal of 1921 at the level which is now designated as 120 in the scale of indices.

At the present time (August, 1921) the index figure prepared by the United States government stands at 148 for general wholesale prices and at 200 for wholesale building material prices as compared to the standard of 100 set in 1913. It must be realized that the year 1913 was a year of considerable depression and that wholesale building material prices at that time were sub-normal. Considering the fact that all wholesale prices have been advancing approximately 2½% a year, it is but natural to believe that, even if there had been no war, wholesale building material prices would have advanced at least that much which would bring the index figure to 120. Added to this is the fact that the index figure of building material costs of 1913 was sub-normal. It is therefore fair to believe that if the war had not intervened the general increase in labor costs and other factors contributing to increased prices would have brought the normal index figure of building materials at least to 130, if not somewhat higher. We find, therefore, that building costs today are approximately 70 points higher than the established normal for 1921.

There is another factor to be considered—the line of stabilization of prices. At first thought it might seem that prices should stabilize at the so-called normal level. Considering this matter we may turn from this question for a moment to analyze the accompanying illustration (Fig. 1) which is merely a chart showing the wholesale price fluctuation in the United States for 110 years. It will be noted that after the war of 1812 and after the civil war it took periods of about 20 years for prices to reach the pre-war levels. Naturally, building construction cannot be expected to decrease in cost any more than in proportion to the general decrease in all commodities and labor costs. We may therefore expect not only that the ultimate reduction in cost cannot be greater than an index figure which normally would be 30% higher than in 1913, but that we must allow a period of a few years for all costs to reach a normal level. Granting that through the Federal Reserve Bank (and other recently established means of controlling economic adjustments during a re-construction period) this period will be considerably shortened as compared to similar periods following previous wars, it is plain that we cannot expect a return to a so-called pre-war level or to a normal index figure in less than eight or ten years. The consensus of opinion seems to be that building should proceed when costs have become stabilized. Evidently the line of stabilization will not be a straight line drawn through normal points for the next ten years, but will bear a direct relation to the falling of all wholesale prices and labor costs.

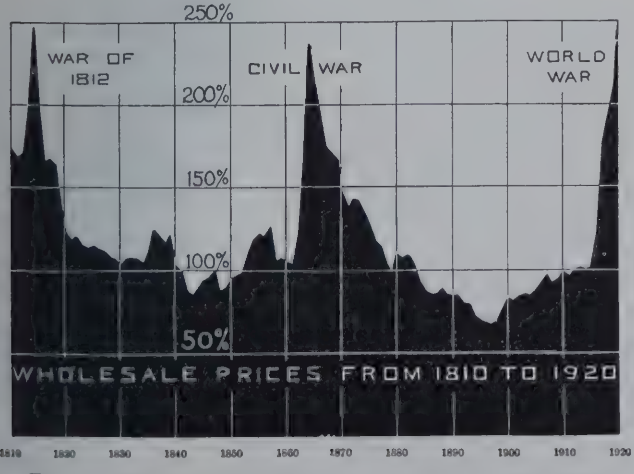


Fig. 1. This diagram, prepared by The Russell Sage Foundation, illustrates the fluctuating of prices during 110 years. The contour of the curve of prices is a condensed version of the economic history of the country.

Leonard P. Ayres, Vice-president of the Cleveland Trust Company, has this to say in a recently issued bulletin entitled "Price Changes and Business Prospects": "We may lay down six general rules with regard to price movements":

1. Wholesale prices move first and farthest.
2. Retail prices move more slowly and less violently.
3. Wage levels change more slowly than levels of prices.
4. Manufactured articles, having a high labor content, change their price levels more slowly than do raw materials, having a low labor content.
5. Salaries change more slowly than wages.
6. Rents change more slowly than prices, wages or salaries.

Evidently, the cost of building has still to feel the reaction of the reduction of wholesale prices which is being followed by a reduction in retail prices of building materials. An important decision on wages of building labor just rendered by Judge Landis (described in detail in the Service Section of this issue) bids fair to establish a precedent in the reduction of building labor costs. In view of these facts we may expect the point of stabilization for the year 1922 to be fairly between the normal index figure of 130 and the present index figure of 194.82. In other words, it is approximately 170 now and will descend during the next few years in relation to all gradually falling prices. It may be expected that the line of stabilization in building costs will gradually fall to meet what might be conceded as the normal, in 1930.

We can see ahead, therefore, a period of building activity started by those who really need buildings and who realize that there is nothing to be gained by waiting over a long period of years for such reduction in costs as may be anticipated along the line of stabilization just described. The second diagram shown here (Fig. 2) indicates how the cost of building increased disproportionately to

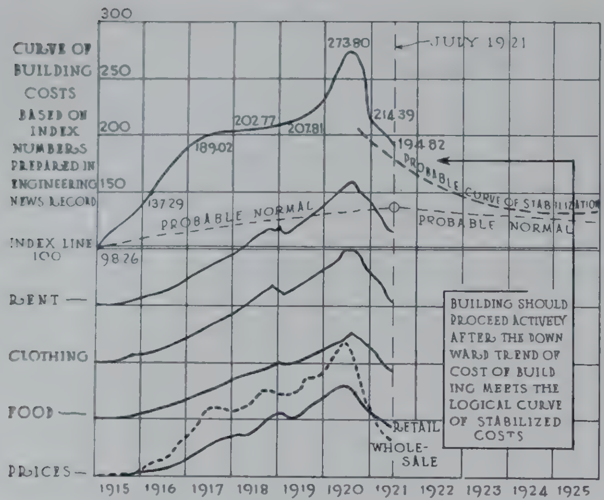


Fig. 2. This chart shows a comparison of the changes in the cost of building, rents, clothing, etc., since 1915. A line showing the probable normal cost of building if there had been no war; also a probable curve of stabilization, based on information by Leonard P. Ayres, Vice-president, Cleveland Trust Company.

the various elements which enter into the cost of living. This, of course, was due to the unusual demands of the war period and it will be seen that the line of building costs is now approaching the same tangent of reduction shown by the lines of the elements which enter into the cost of living. Before many months these lines will be running approximately parallel, and that is the time when building costs will be definitely stabilized. It would seem that the breaking of the buyers' strike in the building field is but a matter of a comparatively short time, when the public will realize that it is not a question of waiting for building costs to reach the so-called pre-war level, but for the cost of building to maintain a balanced relationship with rents, clothing, food, wages and salaries.

Another point which is encouraging in regard to investment building is that in entering a long period of falling prices the value of the dollar is increasing. This point is brought out strongly in deductions made by Leonard P. Ayres as a summary of the results of his investigations of price changes and business prospects, from which we quote:

1. Business prosperity depends on the prices of things, of services, and of money, and on the relation of each to the others.

2. When prices are changing, wholesale prices move first and most, retail prices next, wages next, and rent last and least.

3. Any considerable change in the general price levels of other countries is reflected by corresponding changes in the price levels of this country. We are no longer economically independent. The prosperity of each country is in part dependent on the prosperity of other countries.

4. While price inflation and reduction have been serious here, they have been far more violent abroad. We are less hard hit in this period of readjustment than is any other important nation.

5. Three times during the past 110 years the general wholesale price level has reached the 1920 figures. In each of the two previous cases the peak of high prices has been followed by about 30 years of irregularly falling prices, and then by about 20 years of rising prices.

6. It is probable that we are entering upon an extended period of falling prices, broken by occasional shorter periods of rising prices. The conduct of business in such times presents radically different problems from those to which Americans have become accustomed during the past quarter-century of rising prices and shrinking dollars.

7. During times like the present, when prices are high, but falling, plant extensions should be avoided unless greatly needed; financing should be on short maturities, if possible; debts should be paid before the dollar gets still more valuable, and hence harder to secure; the accumulation of stocks of raw materials should be avoided; bank balances should be built up; bonds should be purchased.

8. So long as the dollar continues to increase in purchasing power, debts, rents, and taxes will be harder to pay. Business transactions or investments, through which stated sums of money will be received at periodic intervals in the future, will prove more profitable than present standards would lead one to believe, while agreements to pay fixed amounts at future dates will be more difficult to live up to than present conditions and past experience would indicate.

9. In the long period of falling prices following the civil war wages declined far less than did prices. In that same period the productivity of labor greatly increased as the mechanical means of production were improved. The future course of wages depends largely on the degree to which the per capita output can be increased, through improvements in management, processes and machinery.

10. The immediate prospects of business at any given time can best be judged by studying the development of business cycles, which progress through phases of prosperity, forced production, liquidation, and readjustment, back to a revival of prosperity. They are most accurately foretold by the changes in the market prices of industrial securities. At present we are passing through the latter stages of liquidation, and have entered upon those of readjustment.

In order that a graphic presentation of some of the points brought out in this article may be available, we have prepared from various sources of data the chart shown as Fig. 2 which indicates the relative fluctuations in wholesale and retail prices, the cost of food, the cost of clothing, the cost of rent and the cost of building since 1915. We have also indicated on this chart a proper approximate normal line along which building costs would have passed if there had been no war. We have indicated also the probable curve of stabilization of building costs. This is based on its local relationship to generally falling costs, and when the curve of the cost of building comes slightly farther down to meet this curve of stabilization it may be expected that we are entering upon an era of active building construction. Probably this will not be a building boom, but will be a steady period of activity, which is much more desirable. It may be noted with additional interest that due to better control of economic conditions and to the intervention of the Federal Reserve Bank during the reconstruction period, that in about two years the cost of living will have come down as far as it dropped in five years after the civil war. This fact is significant in that it promises a much shorter period of decreasing prices and consequently a more rapid recovery from the effects of the war than was enjoyed after either the war of 1812 or the civil war. Is it not evident that the period between the fall of 1921 and the time of the return to stabilized building costs, which is indicated for some time next year, should be one of planning? If the architect can demonstrate to a prospective client that the time to plan his building is drawing near, this should mean the development of additional work in many offices. Certainly those who are forced to build will feel better if their plans are ready, in order to take advantage of the first period of stabilization in the building market.

Plate Description

THE CHARLES T. MILLER HOSPITAL, ST. PAUL

C. H. JOHNSTON, ARCHITECT

THE tendency of the modern hospital is away from the traditional, stereotyped development which made a hospital a dreary place and toward another form of treatment which is making it as attractive and inviting as its character and purpose permit. This tendency has been noticeable for some years and in widely separated sections of the country, and the Charles T. Miller Hospital, recently erected at St. Paul, exemplifies this difference in treatment and presents some interesting solutions of unusual problems.

The considerable area which the hospital occupies fronts upon three streets of radically different grades—Summit avenue, one of the chief thoroughfares of the city, College avenue and Rice street. The placing of the main entrance upon College avenue is due partly to the more favorable topographical conditions and partly to avoid the congestion of traffic which blocks Summit avenue. Such placing of the building brings the greater part of the hospital into a position where it receives the greatest possible amount of sunshine, and the arrangement of administrative and service departments near the main entrance renders the first floor available for wards and patients' rooms overlooking a lawn upon the Summit avenue side. This placing of the present structure upon the property leaves space for future buildings.

Free beds, of which there are 50, are arranged in small wards containing one, two, four or six beds. The remaining 166 beds which the hospital contains, are entirely in private rooms, most of which are equipped with private baths, the rest having individual lavatories and toilets. The planning of the building places the service departments of each floor, such as diet kitchens and service rooms, near the central part of the structure to make as easy as possible the distribution of food and to afford every convenience for examinations and the handling of surgical dressings, this section of the building being served by electric elevators, which connect the diet kitchen with the auxiliary kitchens upon each floor. The passenger elevators extend to the roof of the main building, where convalescent porches and other features for outdoor treatment will be provided. Upon the fourth floor the north wing contains the operating rooms, obstetric section and laboratories. The rooms for operating and their accessory rooms, complete with all surgical equipment, are at the north end of the wing, and delivery, wash-up and sterilizing rooms, with the nursery, are at the opposite end. This separation of the nursery from close proximity to rooms for maternity patients in the south wing has proved to be advantageous.

Connected with the main building by pipe and service tunnels is the two-story structure which contains the power plant with its equipment upon the lower floor and the laundry upon the floor above. Heating is supplied by a two-pipe vacuum system making use of exhaust steam from engine units. In the boiler room are placed two 250-h.p. water tube boilers, and the pump room contains vacuum, boiler feed water and service pumps, feed water and domestic water service heaters. The main facade of the hospital presents a well designed treatment in the renaissance style, of dark red brick trimmed with Indiana limestone.

View of the Miller Hospital Showing Service Building and Ambulance Court

EDITORIAL COMMENT

THE ARCHITECTURAL PROFESSION AND FIRE PREVENTION

THOUGHTFUL writers and economists have repeatedly pointed out the colossal annual loss in property and lives which is incurred in America through fire, and the pressing need for so ordering our methods of building that this drain upon the country's resources may be lessened. It has been frequently set forth that during the past few years when building has been greatly curtailed, owing to conditions during and following the war, the losses through fire have continued unchecked with the result that new construction has scarcely equaled that destroyed. Considerably more than $300,000,000 goes up in smoke every year and some 18,000 human lives are lost as a contributing result. In addition to this vast loss in property and lives there must be considered the enormous cost borne each year,—not for fire prevention but merely for fire protection,—only as a safeguard against the actual spreading of fires already started. This vast expense, which might at least be greatly reduced, is adding yearly to the crushing weight of taxation already being carried upon the patient shoulders of the American public.

Reflection on our fire losses is once again brought to mind by the approach of "Fire Prevention Week" beginning October 9, a date selected because of its being the anniversary of the memorable Chicago fire. Public attention thus focused on the problem has a special meaning for architects. In this era of progress in so many directions and at a time when it is claimed that certain evils hitherto regarded as necessary have been overcome, it is hardly to the credit of the architectural profession or the building trades that the country continues to build by methods and with materials which have already involved a ruinous loss of property and a far greater loss in human lives than all the wars in which the United States has ever been engaged. That the greater portion of this is needless is attested by the fire records of Europe, where the per capita fire loss is only one-tenth that in this country.

Fortunately, the way to safer and more dependable methods of building is not difficult to find. For many years the manufacturers of building materials have been bringing continually to the attention of architects improved methods and means of constructing relatively or actually fireproof buildings. The possibilities offered by these methods and materials have undoubtedly led the way to better building, which is a long step in the right direction, but there seems to be little reason why a much larger proportion of the country's buildings should not be so constructed that fire, if not wholly preventable, would at least be so confined and localized by use of modern "slow burning" construction that loss of life would nearly always be avoided.

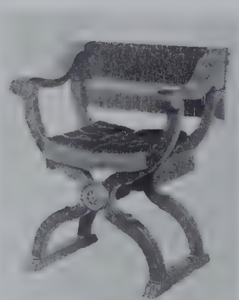
It cannot be claimed that use of these advanced building methods or the employment of fire-resisting materials are precluded by reason of their costs. The rapidity with which American forests are disappearing and the small progress which is being made in reforestration have caused a steady dwindling of the lumber supply and a correspondingly steady increase in the cost of frame construction, while during exactly the same period the introduction of improved methods into the manufacture of clay products of different kinds and their standardization and production on a larger scale have caused the prices at which they are sold to drop to a point where their cost is but very little more than that of lumber, and this small difference in cost is more than offset in a few years by the smaller expense of upkeep and the reduction in the cost of fire insurance. Frame construction is not necessarily to be condemned, because proper precautions in design and construction will make it proof against rapid combustion and hold fire within prescribed limits.

A great responsibility — that of leadership — belongs to the architectural profession in America. The average client knows comparatively little about building and even less of the relative costs of building and upkeep and the merits of different building materials. It is because of his limited knowledge that he requires the architect. The client rightfully regards his architect as a master of the science of building and is prepared, ordinarily, to follow his advice, much as he would obey the direction of his physician or his lawyer were the question medical or legal, and the architect's function should be correspondingly more than supplying an excellent floor plan clothed with a pleasing exterior.

Leadership in an advance toward improved forms of building could hardly be expected of the building trade, the function of which, ordinarily, is to execute or construct what is designed and planned by the architect. The use of steel construction, which makes possible the huge buildings being erected all over the country, if it was not invented by an architect at least owes its phenomenal development largely to the architects who have availed themselves of the advantages which it offers, and the wide use of fireproof construction will be promoted when the architects of America definitely assume the responsibility of leadership toward that end. It may be said that the development of steel construction was an absolute necessity for the growth of American cities, but equally necessary—and vastly more important—is the prevention of the losses of property and human lives which go on unceasingly under present methods of building.

Arch. Forum
Sept. 1921
pg 111

DECORATION *and* FURNITURE



A DEPARTMENT
DEVOTED TO THE VARIED PROFESSIONAL & DESIGN INTERESTS WITH SPECIAL REFERENCE TO AVAILABLE MATERIALS

IT WILL BE THE PURPOSE IN THIS DEPARTMENT TO ILLUSTRATE AS FAR AS PRACTICABLE MODERN INTERIORS FURNISHED WITH ARTICLES OBTAINABLE IN THE MARKETS, AND THE EDITORS WILL BE PLEASED TO ADVISE INTERESTED READERS THE SOURCES FROM WHICH SUCH MATERIAL MAY BE OBTAINED

VIEW OF CORTILE TOWARD STAIRWAY ARCADE AND LOGGIA

HOUSE OF HENRY FORBES BIGELOW, ESQ., BOSTON

BIGELOW & WADSWORTH, ARCHITECTS

The walls are cream colored stucco with architraves and caps in gray cement and floor of red brick

Interiors Adapted from the Italian

PART I

By WALTER F. WHEELER

Of the many qualities which unite to render the arts of Italy so enduringly satisfying there is none which is stronger than what might be called the combining of practicability in its highest form with beauty of appearance. While this admirable quality appears in many of the arts it is particularly evident in domestic architecture, for in much of such work the necessary utilities are so clothed with a garb of architectural grace that the result is a well balanced and finished work, never overdone or made futile and fussy by the addition of unnecessary details.

It may be this practical quality which commends the Italian style for use in modern American homes, and since the success of architects and decorators in its interpretation is having the effect of causing its wide use, a study of some of its characteristics may be of interest. Italian Domestic Interior Architecture would be a topic upon which volumes might be written, but what is intended in these pages is an inquiry into the interior architecture of the country villa or the simpler forms of the urban palazzo as it existed in Northern Italy during the fifteenth and the early part of the sixteenth centuries, a type which is especially adapted for use in America today. It is the purpose of these articles to point out some of the characteristics and possibilities of the use of this style, to explain proportions, methods of treatment of walls, ceilings, doors and other details which may be of help, and to present illustrations of notably successful work which has already been done in America.

The dwelling of an Italian family, whether in city or country, and today as well as in former centuries, is intended to be first of all a home. In either location the plan of the house would not present essential variations. The entrance doorway probably opened into a hallway which led straight to what was usually the heart of the house—the courtyard or *cortile*, generally at the center of the building and open to the sky. The rooms of all floors fronted or opened upon this courtyard or upon the colonnade which often surrounded it, the plan of the house thus making it complete in itself and more or less shut off from the outside world; even the windows facing the street, when the building was a city home, were often mere loopholes—narrow, vertical apertures in the walls—unless for the sake of architectural emphasis larger openings were desired; as already said, the building was a home, and was regarded as belonging primarily to the family.

The ground floor of an Italian home—the space not taken up by the *cortile*—would be arranged to serve various domestic purposes; here would be the kitchens, serving rooms, store rooms and the living quarters for servants and other household departments, sometimes entered from a separate doorway but quite as often reached from the entrance which led to the main quarters. From this ground floor a stairway, somewhat modest and placed between two walls in most instances, would lead to the main floor just above, where would be placed the important rooms of the house, the family sleeping rooms being often upon another floor, with possibly still another story higher up containing additional sleeping rooms or quarters for servants. Such, in brief and in the main, was—and still is—the plan of the Italian home, whether in city or country.

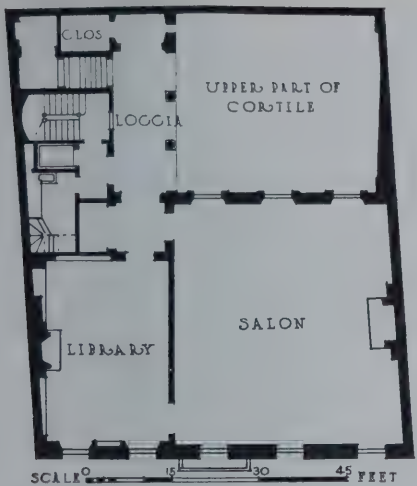
In Italy there has always been the preference, which obtains today in America, for a few rooms of ample size rather than a larger number of small rooms. Unless the building were the home of a family of considerable importance, or of some ecclesiastic of exalted rank, the rooms might not exceed in number those required by an American family today. The ceilings, however, particularly upon the main floor, would be of considerable height, which is desirable in a climate where the temperature frequently rises to a scorching heat, and windows, at least such as opened onto a *cortile* or an interior loggia, would probably be of ample size, opening nearly to the ceiling. Upon this main floor the Italian architect would make the most of the area which conditions placed at his disposal, the aim being to gain the full effect of space where it existed and to simulate its appearance where actual space was lacking. A well planned Italian house always affords ample spaces between openings in the walls. Much of the reserve or reticence which is characteristic of the style consists in the use of a few appropriate and carefully selected fittings rather than of a multiplicity of small objects, and the skill with which they are placed adds greatly to the general excellence of the effect; a successful arrangement, particularly when the pieces used are of characteristic Italian broad and generous lines, requires wall spaces of suitable dignity to afford fitting backgrounds.

As an unusually attractive example of excellent proportions, and having the added merit of being such as are adaptable to American use, there is included here the plan of a residence in Boston built upon the model of an urban palazzo of moderate size. The planning as well as the fixing of the proportions is the result of careful study of many of the best examples of the period. The size and shape of the city plot in this instance made impossible the extending of the building around the *cortile*, but in accordance with excellent precedent the structure is planned upon two of its sides, the walls upon the remaining sides being stuccoed. To relieve their severity these walls are paneled and hung with wooden trellises, and as a concession to the cold of

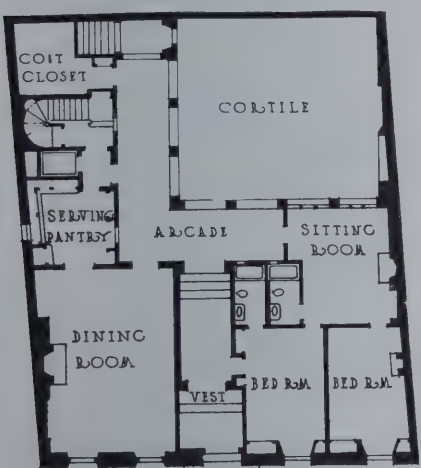
an American winter the *cortile* is roofed with glass. This plan shows the stairway placed where it is readily accessible and yet not given the elaborate and monumental treatment which developed in a later period; here its function is to serve as a means of passage from floor to floor, and not as a vehicle for architectural or decorative enrichment.

The Italian style depends for success almost wholly upon care in handling proportions to create an effect of spaciousness, and the use of good judgment in selecting materials which afford judicious contrasts. As representative of a room in an Italian house of the type under discussion an analysis of the interior illustrated upon this page may be helpful. This drawing room corresponds to the chief formal apartment of an Italian palazzo. As may be seen from the plan of the main floor, page 115, the room is of excellent proportions, the three windows facing south into the *cortile* being far more important than three other windows facing the street. All door and window openings are placed where they preserve the formal effect, but with an intentional disregard of exact symmetry. Wall spaces are not so cut up that opportunity for the suitable arrangement of furnishings is lost. The chimneypiece is placed where it secures the architectural balance of the room as seen from either of the doors through which it might be entered; dimensions of the fireplace opening, 5 feet high by 5 feet 6 inches wide, are entirely correct for an interior of this type and size, and above the fireplace is a simple but extremely well designed mantel of cement. The walls of this spacious drawing room are of rough troweled plaster of a color which varies between a pale gray and a deep cream and possesses texture which gives no suggestion of bareness but seems rather to be intended as an effective foil for the richness of the tapestries and portraits hung against it. The color of the plaster is varied because it was obtained by coats of different tones, the last of which was wiped off, exposing the underlying shade. Woodwork of windows is treated with extreme simplicity and although almost hidden in the deep plaster reveals is painted to match the walls about it. The baseboard is merely a narrow fillet to protect the walls. The floor is of wide chestnut boards possessing vigorous grain, secured with wooden pegs and finished in low color tones.

Drawing Room or Salon in House of Henry Forbes Bigelow, Esq., Boston. Bigelow & Wadsworth, Architects
The wall shown is about 42 feet long with a ceiling height of 18 feet



Main Floor Plan



Ground Floor Plan


Stairway from the Cortile, House of Henry Forbes Bigelow, Esq.

The ceiling of this room is of open timbers; the heavier beams which cross the room at right angles divide the area into nine spaces of almost equal size, these spaces being subdivided by smaller timbers upon a higher level. All this woodwork, which is of chestnut with very little finish, is polychromed with a moderately rich renaissance decoration in which red, blue and other colors are combined. There is no striving to produce a gorgeous and lavish effect, but the atmosphere is that of restrained and thoughtful luxury.

The characteristics of Italian architecture of this type may be summed up under several headings:

Spaciousness. Italian architecture places the greatest value upon simplicity of plan and spaciousness of rooms. Better by far one or two rooms of ample dimensions than a larger number of rooms too small to be effective from an architectural point of view and too contracted for practical use. By the use of good proportions and comparatively few furnishings this appearance of spaciousness is often created.

Ample Wall Spaces. Where use is made of only a few carefully selected pieces of furniture it is highly important that these few be arranged with considerable care, and this makes necessary the provision of broad wall spaces. An Italian architect would always visualize the appearance of a room when furnished, planning for the maintaining of balance and placing utilities such as doors or windows where they would not interfere with the architectural composition.

Severity. Since this style depends upon success in handling contrasts it follows that severity often provides the most effective foil for objects which may be more elaborate. Severity, however, need never be bareness, and even the most severe object may be architectural by reason of its beauty of texture and its fine restraint of such lines as it may possess.

Proportions. More than many architectural types the Italian villa style demands excellence of proportions; this is particularly true since it does not often employ decoration to an extent which would make it the chief consideration. For this reason the architect who would succeed in interpreting this apparently simple but very exacting style must give heed to dimensions of his rooms and even to what might seem to be minor details. The proportions given in these pages are excellent for rooms of their several types.

Crudity of Finish. It would be a mistake to carry out the finish in rooms of this type to the point where every surface or line is worked out to a

mathematical smoothness or evenness. Refinement, to be successful in work of this character, should take the form of discrimination in regard to design and scale; particularly in large domestic interiors, the effect gains greatly from a slight crudity in execution.

Plaster. The various plaster finishes which are useful in developing interiors in houses of this type are produced with the trowel in the same way which the plasterer used in the sixteenth century. Dry color mixed with plaster was employed at that time and is still used, and for interiors which are but sparsely furnished or where but few objects are to be hung upon the walls, polychrome in all-over design is particularly helpful.

A Principal Room in the Famous Davanzati Palace, Florence

Color. The unusually large scale in which Italian domestic interiors are often designed, and the ample sizes of rooms, permit a use of far more color than might be desirable in decoration of some of the more intimate types. There are no colors which are particularly suitable, therefore any may be used, subject only to the restraints and limitations imposed by good taste and careful judgment.

A Low, Vaulted Refectory of a Florentine Palace, Typical of Minor Apartments in Large Italian Villas
This form of interior permits of effective frescoes

LIBRARY IN ITALIAN STYLE IN HOUSE OF J. THEUS MUNDS, ESQ., NEW YORK, N. Y.

JAMES E. CASALE, ARCHITECT

Walls of rough buff plaster with woodwork of dull, rich blue antiqued with gold. Floor and ceiling stained chestnut, latter with panels and frieze in polychrome. Furniture largely of walnut

STUDIO IN HOUSE OF LEONARD M. THOMAS, ESQ., NEW YORK, N. Y.

F. BURRALL HOFFMAN, JR., ARCHITECT

Walls and vaulted ceiling of slightly roughened cream plaster, providing admirable background for tapestries. Mantel of cast cement, woodwork polychromed in pattern. Italian and French furniture

Scale. Because rooms of this character are of larger area and greater height than rooms of most other architectural types used for like purposes in American houses, a much bolder and more vigorous scale must be adopted. Ordinarily architects and decorators fear to use a scale sufficiently robust and the result is apt to be over-refined to the point of weakness. It would perhaps be better, if an error must be made, to err in the opposite direction by establishing a scale over-robust. There is nothing more important in architecture of this type than the use of suitable scale.

Vigorous Mouldings. Closely allied to scale, in architecture of this character, is the question of strong, vigorous mouldings, highly necessary to interiors where walls are so often of plain, rough troweled plaster. One function of a moulding is to cast a shadow; another function is to relieve the eye wearied by too great expanses of wall, and these offices are fulfilled only when mouldings are crisp, bold and virile. Such mouldings may be seen in some of these illustrations and details of a few will be given in later articles of this series.

As an aid to adapting architecture of the early renaissance to modern living there are now being made excellent reproductions of Italian furniture. Certain modern craftsmen are faithfully reproducing original pieces with much of the finish which makes them valuable, not with the idea of deception by reproducing patina and even worm holes, but in the hope of placing within reach of the many what are now, or else long have been, the prized possessions of a few great museums or of a few princely Italian families. The American furniture workers who are making possible the use in modern homes of furniture which possesses the symmetry and grace of that produced in Italy during the fifteenth and sixteenth centuries, are not the only craftsmen who have caught something of the inspiration which produced the original work. Makers of fabrics, wrought iron, tiles, pottery of many kinds, stained glass and workers in all the arts which had a part in creating the Italian villa or palazzo, are producing work which rivals in excellence the work of the older craftsmen, and since in a sense all of these arts are the servitors of architecture, it is its part to choose and employ, to select and to use, the work of them all. Such accessories of architecture will receive due attention in these articles, the hope being that there may result some definite help to architects who may be working in the Italian styles.

Dining Room in the House of J. Theus Munds, Esq., New York. James E. Casale, Architect
This lower story room with glassed-over cortile beyond suggests the usual Italian treatment

The Execution of Furniture and Decoration Commissions

ABOUT one year ago a limited survey was made by THE ARCHITECTURAL FORUM to determine the interest of architects in the question of furniture and decoration. As a result of the interest manifested at that time the Decoration and Furniture Department of THE FORUM was instituted at the beginning of this year. Incidentally, a more complete analysis has been made and it is now possible to give facts and figures regarding the handling of furniture and decoration commissions in architects' offices.

Information received from approximately 1,000 offices in various sections of the country indicates use of four methods of carrying out interior decoration commissions under the supervision of the architect. These include:

1. The recommendation and employment of a high class firm of interior decorators to carry out the entire project in co-operation with the architect.
2. The employment of an interior decorator who acts in the capacity of a professional buyer.
3. Direct purchasing of all furniture, fabrics and objects of art by the architect himself.
4. Purchasing by the client, in consultation with the architect.

Our analysis shows that approximately 70% of the large volume of furniture and decoration controlled by architects is carried out through methods 1 and 2 as outlined here. In dealing with high class decorators, who to a great extent maintain their own show rooms, the procedure calls for conferences between the architect and the decorator and the presentation of sketch suggestions by the decorator in accordance with general requirements provided by the architect. Accompanying these sketches and suggestions are price keys which indicate the total cost. The general requirements of the architect are of course based on consultation with the owner, and the final sketches are submitted to the owner for his approval. The architect then obtains orders for the decorator to proceed with the work and supervises the carrying out of the contract in a manner somewhat similar to his supervision of the actual building construction.

In operating under method 2 the general layout of the rooms, together with any necessary interior sketches, is prepared by the architect and submitted for the approval of the owner. The architect then employs a professional purchaser who brings to his office all necessary samples of fabrics, wall paper and other decorative materials. When this display is properly arranged the client is called in for final decision. From many offices we have reports that this method of executing an interior decorator's commission is highly satisfactory. The interior decorator usually profits by the discounts allowed, while the architect is paid a direct commission for design and supervision in a manner similar to that covering the actual building operations. Approximately 20% of this work is carried out completely by the architect, including the purchasing.

Another interesting method which we have found is used to a limited extent, and which might well be encouraged, is that in which the owner (or else the owner's wife) assumes the part of the professional purchaser and submits for the opinion of the architect samples of fabrics and types of furniture which have been selected.

Almost without exception we find the architect's opinion favorable toward controlling choice of furniture and decorations, and it is evident that many architects who have never before given serious consideration to this phase of architectural practice are now recognizing the possibility of controlling the finishing touches to the buildings which they have designed. Not long ago, in order to determine the trend of thought on this subject, we selected at random 20 houses, already built, ranging in cost from $60,000 to $100,000. We approached the architects who had designed these houses and asked them if it would be possible to get photographs of the living rooms. 17 of the 20 were unwilling to have photographs published because the effect of the interior architectural designs had been almost ruined by indifferent decorations and furniture. In one of the remaining three cases the decorations of the living room had been carried out under the supervision of the architect and were entirely satisfactory; in the second, the interior decorations had been done in a very attractive manner by a firm of interior decorators who were not employed through the architect but kept their work in harmony with his design, while in the third instance the furniture and decorations had been controlled by the owner who happened to be a man of excellent taste and understanding.

Inquiring further regarding the 17 examples of architects' interior designs ruined by unwise decorations and furnishings, we found that in 15 instances the architects had not even suggested to their clients the idea of their supervising decorations and furniture and that in two cases the work had been done wholly by professional decorators who evidently did not know their business. In almost every instance we found that the policy of the architects, who in previous years gave no consideration to the handling of the interior decorations, had changed with a realization of the importance of controlling this feature of architectural design.

We have been surprised by the number of letters from architects which report that invariably the furniture and decoration problems of large buildings are placed under their supervision, often as a part of their original contracts. There are still many unsettled business problems affecting this activity, including not only methods of charging the owner for service rendered but the relations between the architect and the wholesale trade. Various points involved in this connection will be discussed in succeeding issues of THE ARCHITECTURAL FORUM.

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

E. C. Stearns & Co., Syracuse, N. Y. "The Incinerite" ($5\frac{1}{2}$ x 9 ins.). 24 pp.

These pages are for demonstration that incinerators for the disposal of garbage are now a vital part of any equipment, large or small, where the ministering to daily needs brings about the problem of disposing of refuse. Built-in or portable types of this manufacturer's device, the "Incinerite," are explained and dimensions for the placing of units are given. The wall or built-in type is featured for apartments as a compact and efficient outfit. Some typical kitchen views are shown with excerpts from the letters of many satisfied users. It has long been considered that incinerators for hospitals provide the most ideal and sanitary method for the disposition of surgical dressings. "Incinerites" of proper size are recommended for incorporation in the plans of such institutions.

Atlas Portland Cement Company, New York. "The Stucco House" ($8\frac{1}{2}$ x 11 ins.). 96 pp.

A book dedicated to the use of architects, contractors and home builders in which is shown a remarkably good collection of houses which have been designed wholly or in part of Portland Cement Stucco. The high order of the work is explained in the foreword which says that every house was designed by an architect. After a general chapter on stucco, there is one on construction, one on texture and color, one on remodeling, and another on application of stucco. The numerous illustrations and details are large and many plans accompany the halftones. A most interesting chapter is that on texture, provided with colored inserts showing tints secured by use of different aggregates. The text and diagrams on construction are most helpful in securing proper specifications and superintendence, as Portland Cement Stucco will not attain its most enduring properties without the following of certain rigidly defined methods, which might seem trivial to those not accustomed to its use. For the treatment of surfaces or openings a fund of inspiration is given for modeling and troweling.

The Truscon Laboratories, Detroit. "Technical Pamphlet No. 8" (4 x 7 ins.). 28 pp.

This is a four-part discussion on the waterproofing of concrete by the integral and plaster coat methods with Truscon Waterproof Paste, Concentrated. Technicalities are made clear to the reader who is not familiar with chemical or physical phenomena by apt similes or other means. Minute porosity as it exists in all mixes of concrete, despite the aggregate, is brought out and the means of applying a remedy is shown by what is known as colloidal development. Model specifications are briefly introduced for integral treatment and proper application of the plaster coat is described, together with sectional drawings of each. Problems in waterproofing of cellars, tanks, etc., are well handled by those who have a thorough understanding of the substances which are being used.

ANNOUNCEMENTS

Wm. B. Simmons and Guy D. Farwell announce the formation of a partnership under the firm name of Simmons & Farwell, Constructors, with offices at 201 Dyal-Upchurch Bldg., Jacksonville, Fla.

John N. Tilton, Jr., of Marshall & Fox, architects, announces that he is continuing the practice of architecture established in 1882 by his father, the late John N. Tilton, with offices at 721 N. Michigan avenue, Chicago.

Harrison Earl Baldwin announces the opening of an office for the practice of architecture at 28 Carmel street, New Haven, Conn. Manufacturers' samples and catalogs are requested.

The H. H. Winner Company, bank architects and engineers, have removed their offices to the second floor of the Cunard Bldg., 503 Market street, San Francisco.

The American Wood Preservers' Association has just established a Service Bureau with headquarters at 1146 Otis Bldg., Chicago. It is the aim of the Association to make this Service Bureau of direct benefit to all users of wood and those interested in the conservation of our forest resources by furnishing information regarding treated wood and its durability.

F. E. Fowler, formerly of the firm of Fowler, Capelle & Troutman, architects, Evansville, Ind., is directing architectural work for the Consolidated Realty and Theatres Corporation, 332 S. Michigan blvd., Chicago. Manufacturers' samples and catalogs are requested.

Chambers & Thomas announce the removal of their office to Reconquista 491, Buenos Aires, Argentina.

Emile G. Perrot, architect and engineer, announces the removal of his offices from the Parkway Bldg. to the Boyertown Bldg., 1211 Arch street, Philadelphia.

Theo. L. Perrier, architect, has removed his office to 305 Marine Bank Bldg., New Orleans.

Philip Horton Smith, formerly with Kilham & Hopkins, and Edgar T. P. Walker, formerly with Cram & Ferguson, have formed a partnership for the practice of architecture under the firm name of Philip Horton Smith & Edgar T. P. Walker, architects, with offices at 1260 Little Bldg., Boston. Manufacturers' samples and catalogs are desired.

An architectural exhibition is to be held under the auspices of the Thumb Tack Club of Detroit in the galleries of The Detroit Institute of Arts, October 17 to 30, inclusive. Inquiries regarding exhibits and the year book may be addressed to Wm. E. Kapp, 719 Washington Arcade, Detroit.

In the advertisement of the American Walnut Manufacturers' Association in the July issue of The Forum an error was made in giving credit for the design of the directors' room of the American Exchange National Bank to H. B. Thompson. This building was designed by Lang & Witchell, Dallas, Tex.

SERVICE SECTION

of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

The Building Construction Outlook

TOWARD the end of the summer there seems to have been a stirring in the building industry which would indicate that with the general resumption of fall business there will be considerable more activity than has been shown during the past few months. Recent reports from the F. W. Dodge Company indicate an increase of building construction in New York and Northern New Jersey, in the middle Atlantic states (which show an increase of 44% over July) and in the central West. In the Northwest and in the Pittsburgh district a decrease is noted. A general average shows approximately 30% of this new construction to be in the residential class, 16% for business buildings, 25% for public works and utilities, 15% for educational buildings and the rest of a general nature.

A feature of the situation is the large amount of re-figuring now being carried out through architects' offices. As suggested in the Business and Finance Department of this issue of THE FORUM this is an appropriate time for architects to give consideration to the matter of re-figuring work on which the cost was too high last year. The attitude of subcontractors is considerably changed, showing a real anxiety to cut figures as much as is practicable for the purpose of encouraging future building activity. Reports from real estate offices, as the vacation season ends, would seem to indicate that the demand for residential buildings is almost as pressing as it was at the same season two years ago. In view of the fact that the cost of dwelling construction is approximately 25% lower than it was one year ago it is to be expected that a considerable amount of residential planning will develop in architects' offices, beginning in October and continuing through the winter. This indicates considerable building activity of this kind next spring and we shall probably see the volume of home building which was expected in the spring of 1921. There is no indication that rentals of any class of residential property will be reduced this year, a fact which may serve to convince hesitating home builders.

Mortgage Money

A recent appeal of Secretary of Commerce Hoover, that institutions which hold the people's savings should take the lead in loaning people's money for home building, seems to be producing results. In New York eleven companies, including banks, trust companies and insurance companies, have recently formed a combination to loan immediately three million dollars on small houses. These funds are to be handled through the Title Guarantee and Trust Company, an organization which for some time has maintained a Home Loan Department. It is confidently expected that a number of additional institutions will subscribe to this loan fund. The activity will also encourage a large amount of investment on the part of private individuals and individual loaning organizations. The interest of the American public in the bond market shows a tendency toward this class of investment, which will ultimately be turned into the channel of real estate mortgage bonds.

Building Labor

A most important factor in the labor situation is the recent decision of Judge Landis on the Chicago building labor situation. An outline of this decision is given on the next page. We may say here, however, that the decision called for a material cut in building labor costs and will probably afford a precedent which will do much to stabilize the labor situation throughout the country. Building wage disputes are rapidly being settled at various points and as the amount of unemployment grows it is noticeable that the better class of workmen are coming back to the building industry. This means more efficient production and constitutes an important factor in the lowering of the cost of building.

Building Materials

In the building material field the situation seems to be one of hesitation. Prices have not changed materially in the last 60 days and the manufacturers of building materials have been somewhat discouraged by the lack of reaction to the price cutting which has already been done. There will probably be very little change in the prices of building materials during the next few months, at least until the resumption of activity creates a larger market and the effect of improved labor efficiency and lower labor costs may be felt at the sources of raw materials and in the factories. For those who need buildings of any type this is a good time to make preparations. The spirit of strong competition has developed among subcontractors and every branch of the building industry is not only anxious to get to work but is willing to co-operate to the fullest extent with the investor.

Federal Reserve Bank Reports on Building Activity

IT IS probably known to every architect that the United States is divided into ten Federal Reserve districts. In each of these districts a branch of the Federal Reserve Bank is located. Every month these banks prepare reports covering their districts which give an outline of the various economic factors which contribute to changes in the local business situation. In these reports the building situation is usually included, and it is proposed every month to give in this Department a brief review, from such reports, of the various districts, in order that readers may gain a comprehensive idea of changes in the building situation and any other facts which might be of interest in their relation to the activities of the building construction industry. In this manner it will be possible to indicate the general trends of activities and of public opinion.

These reports for the month of July, which are issued late in August, reflect a decrease in the cost of construction over that of a similar period last year. While they do not show signs of unusual activity in building of any kind, it is interesting to note that a large percentage of the operations is made up of residential construction and that the average unit of construction is of comparatively small cost. In the Philadelphia district it is the opinion of the Federal Reserve Bank that the present inactivity in the building industry is due largely to the lack of investment in buildings such as office buildings, apartment houses and such other structures as might be expected to yield a long term profit to their owners. This condition is due to the fact that the cost of building in the month of July was relatively too high for the possible income through rentals. This report further sets forth that the deadlock which now exists between rents and building costs is probably the most important cause of the present dullness and infers that interest in investment building, which will return when costs have decreased, will in turn stimulate local building activity.

In the New York district the July period showed a decline in the amount of building construction, but residential building continued to constitute a large proportion of the new building projects. In the vicinity of St. Louis the building situation in July continued dull. There was considerable increase, however, in the number of inexpensive homes undertaken. In the vicinity of Chicago considerable improvement in building activity was apparent in July. Here there has been some construction of small apartment hotels, office buildings and moving picture theaters, but in general the high interest and bonuses on building loans are still acting as a deterrent.

In the Kansas City district the returns for July showed that instead of a marked cessation of activities, as expected in mid-summer, building activities were close to those of previous months. In the Richmond, Va., district a very large proportion of the building permits was for residential building, while there was no decrease in the volume of building construction undertaken.

In general, the reports from the various Federal Reserve districts would seem to indicate that during July and August the dullness in the building construction industry was at its worst and that considerable improvement might be expected with the resumption of general business activities in the fall. This is but a further indication of the fact that we are reaching the end of the period of stagnation and that with the increased stability of building costs, which may be expected with the acceptance of wage reductions and further decreases in certain lines of building materials, it would seem that the fall period will show a noticeable resumption of activities.

The Chicago Decision

ONE of the most vitally important decisions ever rendered in its significance to building was that given by Judge Landis in his decree of September 7, pronouncing upon points at issue between labor and the building industry in Chicago, in addition to making wage reductions of from 10 to 36%, bringing the average rate down to $1 per hour or slightly less.

The eight principles which form a basis for a future working agreement, and which decide many of the questions which have been disturbing the building world, are:

1. That there shall be no limitations as to the amount of work a man shall perform during his working day.
2. That there shall be no restrictions of the use of machinery, tools or appliances.
3. That there shall be no restrictions of the use of any raw or manufactured material except prison-made.
4. That no person shall have the right to interfere with workmen during working hours.
5. That the use of apprentices shall not be prohibited.
6. That the foreman shall be the agent of the employer.
7. That workmen are at liberty to work for whomsoever they see fit but that they shall demand and receive the wages agreed upon by the Joint Arbitration Board in this trade under all circumstances.
8. That employers are at liberty to employ and discharge whomsoever among union members they see fit, and in case of scarcity of union men, non-union workmen may be employed.

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

FINANCE

WALTER STABLER
Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER
President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN
President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

SAFETY ENGINEERING

S. J. WILLIAMS
Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN
Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM and THE BUILDERS' JOURNAL.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise.

AUTOMOTIVE BUILDINGS

HAROLD F. BLANCHARD

For years a specialist in the layout and equipment of buildings of this type. Mr. Blanchard is a mechanical engineer and has practical knowledge of special conditions in many sections of the country through personal investigation.

FIRE PROTECTION ENGINEERING

J. D. HUNTER
Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.
President, The Agricultural Engineering Company, Columbus, Ohio. Professor and Head of Department of Agricultural Engineering, Ohio State University.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

LEGAL QUESTIONS

WILLIAM L. BOWMAN
Attorney, Member of the New York Bar

Specialist in legal matters pertaining to real estate and building contracts.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. NEW ENGLAND NEW YORK

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Portland,★ Me.§	Boston, Mass.	Providence, R. I.	Hartford, Conn.	New Haven	New York City	Albany, N. Y.†††	Utica††	Syracuse	Oswego	Binghamton
(1) Bulk Lime....per cwt.	....	....	....	....	....	....	....	....	....	$1.25	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$3.05	$3.20	$3.25	$4.35	....	....	....	$3.70	$3.10	3.90	$3.35
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	4.15	4.50*	4.35*	$4.50	$4.50*	$5.40*	5.25	4.60	4.75	4.50
(4) Crushed Stone....per ton	....	2.50	....	4.35	....	....	3.00	3.75	2.20	3.20	....
(5) Crushed Stone....per yd.	....	....	3.75	3.50	....	4.00*	....	....	2.64	5.25	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	32.00	18.00	28.00	17.00	25.00	17.50	24.00	22.00	20.00	30.00	22.00
(7) Corner Bead, galvanized....per ft.	.045	.04	.05	.045	.05	....	.06	.05	.05	.05	.05
(8) Drain Tile, 4 in....per ft.	.12	.08525	.16	.08	.10	....	.09	.0745	.07	.06	.06
(9) Drain Tile, 6 in....per ft.	....	.128	.30	.14	.15	....	.155	.129	.135	.07	.105
(10) Flue Lining, 8½ in. x 8½ in....per ft.	.30*	40%*	.45	.39	.42	....	32%*	.375	.30	.33	.33
(11) Flue Lining, 8½ in. x 13 in....per ft.	.45*	40%*	.675	.58	.63	....	32%*	.575	.45	.50	.50
(12) Fire Brick, Standard 9 in. No. 1 Clay....per M.	90.00	75.00	90.00	70.00	70.00	75.00	87.50	65.00	73.00	80.00	75.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags....per ton	135.00	25.00*	30.00*	25.00	21.43	15.00*	20.00	13.50	18.00	25.00	20.00
(14) Gravel, washed....per yd.	2.00*	2.75*	2.00	2.50*	....	4.25*	2.00	....	....	....	....
(15) Hollow Building Tile (8x12x12 in.)....per M.	*	280.00	....	300.00	....	252.00	350.00*	275.00	250.00	275.00	300.00
(16) Hollow Building Tile (8x5x12 in.)....per M.	*	68.50	....	....	....	....	200.00	....	135.00	....	....
(17) Hydrated Lime (mason's) in 50 lb. paper bags....per bag	.60	.50	.80	.55	.55	.5125	.70	.569	.60	.65	.50
(18) Hydrated Lime (finishing) in 50 lb. paper bags....per bag	....	.55	.85	.60	.60	.65	.75	.694	.70	.75*	.65
(19) Hair....per bu.	.45	.45	.60	.80*	.60	.675*	.75	.50	.50	.75	....
(20) Metal Lath, Exp., Gauge No. 24, weight 3.4 lbs.‡....per yd.	.35	.322	.38	.35	.39	.3115	.48	.33	.32	.45	....
(21) Metal Lath, Expanded, Gauge No. 25, weight 3 lbs....per yd.	.35	.32	.37	.34	.38	.285*	.46	.33	.30	....	....
(22) Mortar Color, red....per lb.	.05	.03	.03	.025	.03	.03	.035	.025	.05	.05	.03
(23) Mortar Color, buff....per lb.	.10	.15	.04	.08	.04	.04	.06	.0325	.05	....	.05
(24) Mortar Color, double strength, black....per lb.	....	.35	.07	.35	.30	....	.06	.0575	.08	.10	.15
(25) Partition Tile, Clay (3x12x12 in.)....per M.	....	160.00	200.00	160.00	180.00	136.40*	160.00	....	150.00	180.00	....
(26) Partition Tile, Clay (4x12x12 in.)....per M.	....	150.00	220.00	170.00	200.00	153.50*	170.00	155.25	160.00	200.00	160.00
(27) Partition Tile, Gypsum (3x12x30 in.)....per ft.	....	.18	.20	.18	.23	....	.18	....	.16	....	.18
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.20	.24	.21	.25	....	.20	....	.18	....	.20
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)....per bbl.	3.70	3.50	3.70	3.48*	3.70	....	3.60	3.85	3.30	3.35	3.50
(30) Extra charge for each cloth sk....per sk.	.10	.10	.075	.08	.075	....	.10	.075	.075	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	90.00	75.00	....	....	....	....	....	....	65.00	75.00	....
(32) Plaster Board, ⅜ in. thick....per M. sq. ft.	40.00	34.00	40.00	28.00*	32.50	.28*	35.00	34.50	35.00	32.00	35.00
(33) Sand (Building)....per ton	....	2.00	....	....	....	....	....	2.50	....	....	4.00
(34) Sand (Building)....per yd.	....	2.50	2.00	1.50	....	1.80	2.00	....	....	4.00	....
(35) Sewer Pipe, single strength, off list....per cent.	25%	40%	30%	40%	30%	20%	32%	47%	50%	45%	45%
(36) Wall Coping, 9 in....per ft.	.20	35%*	.32	40%*	.28	.32	32%*	.36	.20	.22	.22
(37) Wall Coping, 13 in....per ft.	.30	35%*	.48	40%*	.42	.48	32%*	.54	.30	.33	.33
(38) Wall Plaster, neat, in paper, in 80 lb. bags....per ton	....	....	....	25.00	....	....	....	....	18.75	....	20.00
(39) Wall Plaster, neat, in cloth, 100 lb. sks, incl. sks....per ton	24.00	24.00*	24.00*	24.00*	28.00	22.00*	26.00*	22.00*	20.50*	22.50	22.00*
(40) Wall Plaster, sanded, in cloth, 100 lb., incl. sks....per ton	....	21.00*	21.00*	20.50*	21.00*	18.00*	20.50*	15.00	14.20*	22.50	20.00
(41) Wall Plaster, wood fibre, in cloth, 100 lb., incl. sks....per ton	24.00	24.00*	24.00*	24.00*	28.00	26.00*	26.00*	22.00	20.50*	25.00*	20.00
(42) Wall Ties, galvanized....per M.	....	12.60	....	6.50	6.00	5.00	6.00	5.00	5.00	6.00	5.00
(43) Wall Plugs....per M.	....	35.00	35.00	....	30.00	30.00*	30.00	25.00	25.00	28.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	7.75	7.50*	9.50*	7.50*	....	8.50*	....	6.50†	7.00*	7.00*	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	2.10**	3.00*	....	3.50	....	....	4.35†	2.85†	3.00**	3.00†	4.00*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	2.85§*	2.30§*	3.50§	4.25§*	....	....	2.88§*	2.85§*	....	2.25§	4.25§
(47) Stucco Board, Medium wt....per M. sq. ft.	....	50.00	....	55.00*	....	70.00	....	60.00*	55.00	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	65.00	....	60.00*	....	....	....	....	60.00	....	....
LUMBER ITEMS			*			*	*	*			
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	....	8.50	9.50	11.00*	9.00	10.50*	11.00	10.00*	....	12.00	12.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	....	....	....	85.00	....	....	....	48.00	....	40.00	45.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	45.00	45.00*	....	45.00	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	38.00	40.00*	....	40.00	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	....	....	....	....	....	....	....	40.00	....	36.00	....
(54) 1x4 "B" Flooring....per M. Board ft.	....	....	....	60.00*	....	....	75.00	85.00*	....	64.00	....
(55) Yellow Pine Clear Finish....per M. Board ft.	....	....	....	90.00	....	....	85.00	90.00	....	75.00	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	65.00*	....	....	68.00	....	....	75.00	....
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	....	....	....	....	....	....	....	65.00*	....	50.00	....
(58) Cypress Finish Lumber....per M. Board ft.	....	....	....	125.00	....	....	160.00	160.00	....	160.00	....
(59) ¾x4 "B" Partition....per M. Board ft.	....	....	....	70.00	....	....	75.00	70.00	....	75.00	85.00
(60) ½x4 "B" Ceiling....per M. Board ft.	....	....	....	50.00	....	60.00	60.00	65.00	....	50.00	60.00
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	....	....	....	60.00*	....	75.00	60.00	65.00*	....	60.00	....
(62) Mouldings, Yellow Pine....over list	....	....	....	50%	....	....	....	....	....	.015*	....
(63) Washington 16 in., 5/2 Clears....per M..	....	....	....	....	....	....	5.50	6.75	....	6.50	6.75
(64) Washington 16 in., 5/2 Clears....per sq.	....	....	....	....	....	....	....	5.50	....	5.46	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	....	6.50	....	....	....	....	....	6.75	7.75
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	....	....	7.20	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow Pine Boards....per M.	....	....	....	35.00*	....	....	45.00	48.00*	....	50.00	63.00*

*(Above Item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

§Portland, consumer prices; contractor quotations on application.

†††Albany allows 10% and 2% off to contractors before 10th of month following delivery.

Lime, Barreled (Item No. 3), 280 lbs.—Providence, Hartford, Albany, common; 300 lb. barrel, New York City; **Hydrated** (Items 17, 18)—Oswego, per bu. of 70 lbs.

Crushed Stone (5)—New York, per 2600 lb. yd.

Flue Lining (Item 10, 11)—Boston, Albany, off list. Portland, 25%—10% cash.

Fire Clay (Item 13)—New York City, 100 lb. bag rate; no credit for returned cloth sacks, Boston, New York, Providence.

Gravel (14)—New York, 2600 lb. yd. Portland, F. O. B. cars; Boston, Hartford, per ton.

Hydrated Lime (Items 15-16)—Portland, not stocked in Portland; Albany, heavy, less 10% and 2%.

Hair (19)—New York, per lb.; Hartford, 4 lbs. per bu.

Metal Lath (Item 21)—New York City, Gauge 26.

Par. Tile (25, 26)—New York, less than 2,000 ft.

P. Cement (Item 29)—Hartford, less 8c rebate.

Plaster Board (Item 32)—New York City, price for each, size 32x36x⅜ in.; Hartford, 32x36x⅜.

Wall Coping (36, 37)—Hartford, Boston, Albany, per cent. off.

Wall Plaster (38, 39, 40, 41)—Returned bags, Syracuse, Utica, Providence, New Haven, 15c; Albany, Oswego, 10c each; Boston, 12c each; Hartford, 13c rebate for bags; New York City, 25c. Sacks extra, Binghamton.

Wall Plugs (Item 43)—New York, chiefly hardware dealers.

Roofing, Slate Surf. (Item 45)—70 lbs., Syracuse; Portland, 3 ply.

Roofing, Smooth Surf. (Item 46)—55 lbs., Boston, Hartford, Albany; 3 ply, 63 lbs., Utica; Portland, 3 ply.

Stucco Board (Items 47, 48)—Hartford, Utica, creosoted.

(**Item** 49)—Hartford, Utica, spruce; New York City, Eastern spruce. (**Item 51, 52**)—Utica, 1x8 in.; (**Item 54**)—Hartford, B Flat; Utica, flat grain; (**Item 56**)—Hartford, fir; (**Item 57**)—Utica, spruce; (**Item 61**)—Utica, 6 in.; Hartford, 6 in. Red Cedar; (**Item 62**)—Oswego, per inch; (**Item 67**)—Binghamton, Hartford, No. 2 C.; Utica, No. 2 Com.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. NEW YORK, PENNSYLVANIA, NEW JERSEY

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Elmira	Rochester	Buffalo★	Jamestown, N. Y.	Allentown, Pa.	Erie	Philadelphia	Reading	Pittsburgh	Scranton	Newark, N. J.	Paterson, N. J.★
(1) Bulk Lime....per cwt.	....	....	....	....	$0.75	....	$0.55	$0.75*	$1.00	$0.80	....	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$3.80	$3.50	$3.25*	....	3.00	$3.40	.75*	....	2.75	3.00	$3.15*	$ 3.60
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	5.25	4.75	5.00	....	4.00	5.10	....	....	5.25	....	5.70*	5.50
(4) Crushed Stone....per ton	....	2.50	....	....	2.10	2.30	4.25	3.00	7.00*	2.75	3.35	3.15
(5) Crushed Stone....per yd.	2.50	2.00	....	....	....	....	....	....	....	....	4.00	3.65
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	30.00	18.00	25.00*	$35.00	19.50	25.00	20.00*	20.50	20.00	17.00	21.00	20.00
(7) Corner Bead, galvanized....per ft.	.07	.05	.05	....	.06	.04	.035	.05	.06	.06	.05	.09
(8) Drain Tile, 4 in....per ft.	.09	.06	.055	.085	....	.0525	....	.07	.06	.08	.09	....
(9) Drain Tile, 6 in....per ft.	....	.11	.12	....	....	.095	....	....	....	.14	.1675	.17
(10) Flue Lining, 8½ in. x 8½ in....per ft.	.50	.30	.30	.42	.36	.30*	.36	.36	.30	.38	.39	.42
(11) Flue Lining 8½ in. x 13 in....per ft.	.65	.45	.45	.63	.54	.45*	.54	.54	.45	.57	.585	.63
(12) Fire Brick, Standard 9-in. No. 1 clay....per M.	80.00	65.00	75.00	75.00	60.00	75.00	75.00	70.00	75.00	70.00	69.00	85.00
(13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	20.00*	20.00	18.00*	30.00*	18.00‡	16.00	22.00	22.00	20.00*	20.00*	17.00	35.00
(14) Gravel, washed....per yd.	2.00*	2.50	2.90	....	....	3.50	2.55*	4.00*	2.00*	2.00*	4.20	3.50
(15) Hollow Building Tile (8x12x12 in)....per M.	260.00	230.00*		....	235.80	220.00	....	....	120.00	280.00	285.00	....
(16) Hollow Building Tile (8x5x12 in.)....per M.	....	250.00*	118.00	120.00	111.20	80.00	....	....	....	....	120.00	....
(17) Hydrated Lime (masons) in 50-lb. paper bags....per bag	....	.475	.50	.75	.50	.525	.40625	.60	.50	.55	.50	.60
(18) Hydrated Lime (finishing) in 50-lb. paper bags....per bag	.75	.50	.525	.75	.66	.55	.5875	.80	.55	.65	.65	.70
(19) Hair....per bu.	.65*	.75*	.48	....	.75*	.15*	.40	.50	.75*	.70*	.70	.50*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡....per yd.	.45	.37	.36	.39	....	.37	.331	.40	.32	.33	.39	.50
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs....per yd.	....	.35	....	....	....	.30	.2925	....	.32	....	.38	.43
(22) Mortar Color, red....per lb.	.06	.06	.03	.05	.038	.03	.035	.05	.0225	.06	.03	.04
(23) Mortar Color, buff....per lb.	.06	.06	.035	....	.047	.035	.035	.04	.0325	.06	.04	.15
(24) Mortar Color, double strength black....per lb.	.10	.06	.06	.06	....	.06	.10	.10	.05	.08	.07	.15
(25) Partition Tile, Clay (3x12x12 in.)....per M.	....	100.00	122.00	....	....	90.00	210.00	....	....	....	145.00	270.00
(26) Partition Tile, Clay (4x12x12 in.)....per M.	150.00	120.00	137.00	....	138.00	100.00	230.00	....	110.00	160.00	160.00	300.00
(27) Partition Tile, Gypsum (3x12x30 in.)....per ft.	....	.0975	.135	.12	.16	....	.16	.18	.15	....	.1525	.20
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.12	.1625	.16	.17	....	.19	.19	.17	....	.195	.21
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)....per bbl.	3.40	3.00	3.35	3.30	3.00	3.40	3.10	3.50	2.85	3.40	3.05	4.00
(30) Extra charge for each cloth sk....per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.25
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	.....	50.00	*	....	75.00	....	....	55.00	45.00	45.00	51.00	55.00
(32) Plaster Board, ⅜ in. thick....per M. sq. ft.	37.50	40.00	33.75	37.50	38.00	50.00	40.00	40.00	50.00	37.50	32.50	37.50
(33) Sand (Building)....per ton	....	....	....	....	3.80	3.50	....	4.00	2.00*	3.00	2.15	2.60
(34) Sand (Building)....per yd.	3.50*	2.50	2.90*	....	....	3.00	2.30	....	....	....	2.70	2.75
(35) Sewer Pipe, single strength, off list....per cent.	40%	45%	45%	35%	39%	50%	38%	35%	45%	40%	35%	30%
(36) Wall Coping, 9 in....per ft.	.25	.22	.22	.28	.24	.20	.248	.30	.20	.26	.26	.28
(37) Wall Coping, 13 in....per ft.	.36	.33	.33	.42	.36	.30	.372	.45	.30	.38	.39	.42
(38) Wall Plaster, neat, in paper, in 80-lb. bags....per ton	23.00	20.00	21.00	22.00	....	....	....	....	24.00	....	....	....
(39) Wall Plaster, neat, in cloth, 100-lb. sacks, including sacks....per ton	23.00	20.00	20.00	22.00*	25.00*	25.00	22.50*	27.00	26.00*	24.00*	22.00	25.00
(40) Wall Plaster, sanded, in cloth, 100-lb., including sacks....per ton	23.00	21.00	14.00*	21.00*	22.00*	17.00*	17.50*	23.00	22.00*	17.40*	16.80*	20.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb., including sacks....per ton	23.00	19.00	19.00	22.00*	....	25.00*	22.50*	....	26.00	24.00*	....	28.00
(42) Wall Ties, galvanized....per M.	5.00*	5.00	5.00	5.00	3.50*	3.50	6.00	5.00	4.50*	....	5.00	4.00
(43) Wall Plugs....per M.	22.50	25.00	20.00	....	25.00	....	....	....	30.00	....	18.50	26.00
(44) Asphalt Shingle (*singles; †stripped)....per sq.	7.00†	7.25*	....	7.50*	7.50†	9.00	8.00	7.00	8.00†	7.00*	7.45	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	3.25**	2.75**	....	3.00*	3.25	....	....	2.75	....	3.00*	3.00*	....
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	3.00§*	3.25§*	3.30§	3.25§	2.90	....	....	....	....	1.50*	3.15§	....
(47) Stucco Board, Medium wt....per M. sq. ft.	55.00	55.00*	.....	....	....	70.00	....	55.00	55.00	45.00	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	....	60.00	60.00	68.00	75.00	65.00	65.00	60.00	50.00	....	70.00
LUMBER ITEMS										*		
(49) Wood Lath, No. 1 (Size 4 ft.)....per M.	12.00	....	....	13.00	....	11.00	....	12.00	13.00	12.00	10.50*	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	46.00*	....	....	42.00	....	42.00	....	42.00	46.00	45.00	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	45.00	....	45.00	60.00	45.00	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	46.00	....	....	42.00	....	40.00	....	40.00	44.00	45.00	....	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	38.00	....	....	42.00	....	40.00	....	40.00	44.00	40.00	....	....
(54) 1x4 "B" Flooring....per M. Board ft.	70.00	....	....	65.00	....	65.00	....	65.00	65.00	80.00	....	....
(55) Yellow Pine Clear Finish....per M. Board ft.	100.00	....	....	100.00	....	100.00	....	90.00	100.00	100.00	....	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	70.00	....	6.50	....	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	50.00	....	....	60.00	....	55.00	....	65.00	58.00	....	....	....
(58) Cypress Finish Lumber....per M. Board ft.	120.00	....	....	....	....	150.00	....	....	165.00	165.00	....	....
(59) ¾x4 "B" Partition....per M. Board ft.	70.00	....	....	70.00	....	65.00	....	90.00	73.00	90.00	....	....
(60) ½x4 "B" Ceiling....per M. Board ft.	60.00	....	....	60.00	....	60.00	....	60.00	58.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	55.00*	....	....	60.00	....	60.00	....	....	75.00	80.00*	....	....
(62) Mouldings, Yellow Pine....over list	1.25	....	....	1.25*	....	1.00	....	....	1.25	1.50*	....	....
(63) Washington 16 in., 5/2 Clears....per M.	....	....	....	6.50	....	6.50	....	8.00	7.50	7.00	....	....
(64) Washington 16 in., 5/2 Clears....per sq.	5.00*	....	....	5.20	....	....	....	....	7.00	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	....	7.50	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	6.50	....	....	6.00	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.- 10 in. 12 in., No. 1 Com. Yellow Pine Boards....perM.	46.00*	....	....	....	....	....	....	60.00	60.00	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime (bulk, Item No. 1)—Reading, 80 lb. bu.; (Barreled, Item 2)—Newark includes bbls., returned at 10c; (Item 3), finishing, returned bags, 10c, Philadelphia, per bu.; Buffalo, steel drums; (Item No. 3)—Newark, returned bags, 15c each.

Crushed Stone (4)—Pittsburgh, size 1 in.

Common Brick (Item 6)—Philadelphia, f. o. b. job. mfrs. retail price. Buffalo, loads of 1200.

Flue Lining (Items No. 10, 11)—Erie, (10) 8x8 in., (11) 8x12 in.

Fire Clay (Item 13)—Return bags, Elmira, 15c; Jamestown, none; Pittsburgh, paper sacks, $2.00 extra per ton, in cloth sacks, with no allowance for returned sacks. No credit for returned sacks. Buffalo, Scranton, returned sks., 25c.

Gravel (Item No. 14)—Philadelphia; Scranton, 2400 lb. yd.; Elmira, 2500 lb. yd.; 2000 lb. ton, Reading; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Hollow Building Tile (Item 15-16)—Rochester, (Item 15) 4 cell; (Item 16) 6 cell.

Hair (19)—Lbs. per bu., Pittsburgh, Elmira, 4; Scranton, 7; price per lb., Erie; old stock, Rochester, Pittsburgh, fibre; Allentown Govt. Paterson, per lb.

Paving Block (Item 31)—Buffalo, on application.

Sand (Item 34)—2500 lb. yd., Buffalo; Elmira, 2600 lb. yd.; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Wall Plaster (Items 39, 40, 41)—Returned sacks, 15c, Jamestown, Allentown, Scranton, Pittsburgh, Philadelphia, Buffalo; 20c, Erie; Newark, 15c credit for returned sacks.

Wall Ties (Item 42)—Corrugated. Allentown, Elmira; per box, Pittsburgh.

Roofing, Slate Surf. (Item 45)—70 lbs., Elmira; 75 lbs., Rochester.

Roofing, Smooth Surf. (Item 46)—55 lbs., Elmira, Rochester.

Stucco Board (Item 47)—Rochester, Sheetrock.

(Item 49)—Newark, spruce.

(Item 50)—Elmira, 12 ft. and less.

(Item 61)—Scranton, white pine; Elmira, red cedar; **(Item 62)**—Jamestown, per 1½ inches; Scranton, per 100 lin. ft., moulding count; **(Item 64)**— Elmira, 6/2 Star; **(Item 67)**—Elmira, 1 in., 10 in., No. 2 Com.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. MIDDLE AND SOUTHERN ATLANTIC STATES

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Trenton, N. J.	Wilmington, Del.	Washington, D. C.	Baltimore, Md.	Norfolk, Va.	Richmond, Va.	Huntington, W. Va.	Fairmont, W. Va.	Wheeling	Atlanta, Ga.
(1) Bulk Lime	per cwt.	$0.60*	$0.79	$0.75	$ 0.51*	....	....	....	....	....	$1.80*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	*	2.80	2.50	2.50	$2.50	$2.30	$2.80	$2.75	$3.00	2.25
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	*	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	2.90	....	4.50	3.00	3.75	....	5.00	6.50	2.50*
(5) Crushed Stone	per yd.	....	3.85	....	3.65	....	....	....	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	20.00	22.00	22.00	25.00*	18.00*	20.00	18.75	30.00	23.00	12.50*
(7) Corner Bead, galvanized	per ft.	.06	.04	.04	.05	.05	.06	.07	.04	.05	.06
(8) Drain Tile, 4 in	per ft.	....	.10	.08	.07	.08	.08	.075	.06	.06	.09
(9) Drain Tile, 6 in	per ft.	....	....	.11	.14	.12	.125	.12	.10	.09	.11
(10) Flue Lining, 8½ in. x 8½ in	per ft.	....	.36	.30	.30	.33	.33	.342	.30	.30	.45
(11) Flue Lining, 8½ in. x 13 in	per ft.	.63	.54	.45	.45	.495	.495	.513	.45	.45	.60
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	100.00	75.00	85.00	75.00	80.00	85.00	60.00	60.00	70.00	65.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	25.00	21.00	25.00*	18.00	20.00	20.00*	15.00*	14.00*	12.50*	15.00*
(14) Gravel, washed	per yd.	2.50*	2.80	2.25*	2.50	4.00	4.00	3.00	4.00	2.00*	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	210.00*	200.00	250.00	247.50*	....	....	200.00	268.00*	230.00	175.20
(16) Hollow Building Tile (8x5x12 in.)	per M.	....	90.00	130.00	125.00	160.00	....	85.00	100.00	100.00	87.60*
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.475	.45	.45	.375	20.00*	18.50*	21 00*	.44	.60	1.90*
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.65	.70	.57	.50	24.00*	23.50*	22.00*	.525	.60	2.75
(19) Hair	per bu.	.45	.42	.50	.50	.60	.50	.50	.12*	.75	1.00*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.38	.36	.32	.355	.30	.35	.38	.36	.35	.40
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	.37	.32	.43	.305*	....	.35*	35	....	.38	.345
(22) Mortar Color, red	per lb.	.04	.04	.06	.035	.05	.04	.0275	.0265	.035	.0225
(23) Mortar Color, buff	per lb.	.04	.04	.07	.035	.05	.06	.03	.037	.035	....
(24) Mortar Color, double strength black	per lb.	.10	.12	.10	.06	.10	.125	.05	....	.04	.04
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	120.00	120.00	125.00*	180.00	140.00	100.00	....	110.00	140.00
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	130.00	120.00	132.50*	180.00	150.00	115.00	121.50	120.00	150.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	.15	.15	.15	.15	....	.18	.15	....	....	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.18	.19	.17	.18	....	.20	.17	....	....	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.40	3.20	3.00	2.87	3.70	3.15	3.50	2.90	2.70	3.50
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.07	.075	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	65.00*	40.00	....	50.00	....	60.00	32.00*	....	....	....
(32) Plaster Board, ⅜ in. thick	Per M. sq. ft.	35.00*	35.00	32.00	30.00	....	40.00	40.00	35.00	40.00	42.50
(33) Sand (Building)	per ton	2.00	2.35	1.55	2.00	2.00	2.75	....	3.50	2.20	....
(34) Sand (Building)	per yd.	....	2.80	2.00	2.50	2.50	3.00	2.25	....	....	1.25
(35) Sewer Pipe, single strength, off list	per cent.	30%	40%	25%	50%	45%	45%	43%	50%	50%	40%
(36) Wall Coping, 9 in	per ft.	.28	.24	.24	.26	.22	.22	.228	.20	.22	.35
(37) Wall Coping, 13 in	per ft.	.42	.36	.36	.39	.33	.33	.342	.30	.33	.45
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	22.00	20.00	....	....	....	24.00	22.00*	....	21.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks	per ton	....	23.50	22.50*	20.25	22.50*	23.00*	24.00*	22.00*	23.00*	25.00*
(40) Wall Plaster, sanded, in cloth 100 lb. sks., inc. sks	per ton	....	20.00	23.00*	21.50	22.50*	23.00*	24.00*	....	16.00	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. sks., inc. sks	per ton	....	23.50	23.00*	27.00	22.50*	23.00*	24.00*	22.00*	23.00*	....
(42) Wall Ties, galvanized	per M.	4.50	5.00	5.00	5.00	5.00	5.00	4.00	4.00	5.00	3.75
(43) Wall Plugs	per M.	....	25.00	28.00	25.00	....	....	20.00	....	16.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	8.00†	8.50	7.50	5.70†	....	....	6.75*	7.50*	7.50*	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.50*	3.00	3.00†*	2.60**	6.00†	....	3.25*	2.75†*	2.75**	2.75§
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.75†	2.80	2.90§*	2.65§	4.50†	....	2.75§	3.00§*	2.80§*	2.70§
(47) Stucco Board, Medium wt	per M. sq. ft.	....	....	75.00	....	60.00	65.00	....	60.00*	50.00	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	65.00	68.00	....	....	....	....	....	....	....	....
LUMBER ITEMS				*	*	*		*			
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	12.00*	12.00*	6.75	14.00	7.00	6.00	8.50	....	....	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	....	40.00	35.00	55.00	35.00	....	40.00	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	55.00	....	80.00	....	50.00	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	42.50	55.00	....	40.00	....	40.00	....	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	33.00	51.00	30.00	....	....	....	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	....	70.00	60.00	100.00	70.00	....	65.00	....	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	....	80.00	75.00	....	85.00	....	70.00	....	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	70.00	....	....	70.00	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	55.00	....	50.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	145.00	....	....	150.00	....	160.00	....	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	75.00	65.00	100.00	70.00	....	75.00	....	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	....	....	50.00	....	45.00	....	55.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	65.00	....	....	75.00	....	....	....	....	....
(62) Mouldings, Yellow Pine	over list	....	1.00	....	....	1.00	....	1.25	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	....	....	....	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	7.50	....	....	15.00	....	8.00*	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	6.50	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.- 10 in. 12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	....	60.00	40.00	....	58.50	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) **Means no cloth bags.**

Lime (bulk, Item No. 1)—Baltimore, per bu.; Atlanta, bbl. of 3 sacks; Trenton, 70 lb. bu. (Barreled) Trenton, not handled locally, supply from Philadelphia. **Hydrated** (Items 17, 18)—Ton lot price, Richmond, Norfolk, Huntington; Atlanta, barrel price.

Crushed Stone (Item No. 4, 5)—Atlanta, 2,600 lb. yd.

Common Brick (6)—Baltimore, f. o. b. job, mfrs. ret. price. Atlanta, f. o. b. Atlanta; Norfolk, $18.00 and up, according to distance.

Fire Clay (13)—Washington, Atlanta, no credit for sacks; Wheeling, 15c credit for sacks; Fairmont, Huntington, 10c credit for sacks; bulk only, Richmond.

Gravel (14)—Washington, 2,700 lb. yd.; ton price only, Trenton, Wheeling, Washington.

Hollow Bldg. Tile (Item 16)—Atlanta, back up tile, 2 cell, carload price; Trenton, Baltimore, Fairmont, load bearing.

Hair (19)—Bu. of 4 lb., Atlanta; Fairmont, per lb.

Metal Lath (Item 21)—Richmond, Baltimore, Gauge No. 27.

Partition Tile (25, 26)—Baltimore, little demand.

Paving Block (31)—Huntington, culls; Trenton, known as paving brick.

Plaster Board (Item 32)—Trenton, carloads.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c credit, Washington, Wheeling, Huntington, Atlanta, Fairmont; sacks 14½c credit, Richmond; returned sacks, 10c, Norfolk.

Roofing, Slate Surf. (Item 45)—80 lb., Washington, Baltimore; 85 lb., Fairmont; Wheeling, 85 lbs.

Roofing, Smooth Surf. (Item 46)—55 lb., Washington, Fairmont; Wheeling, rolls, 55 lbs.

Stucco Board (Item 48)—Creosoted, Fairmont.

(Item 49)—Spruce, Trenton, Wilmington.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

SOUTHERN AND SOUTHWESTERN STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Miami, Fla.	Tampa, Fla.	St. Petersburg★	Louisville	Lexington	Memphis, Tenn.	Nashville, Tenn.	Birmingham, Ala.★	New Orleans, La.	El Paso,★ Tex.	Houston
(1) Bulk Lime	per cwt.	....	....	....	$0.70	$0.95*	....	$0.60*	....	$0.87	$0.625	$0.95*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$3.30	2.25	$2.75	$2.35*	2.50	$2.00	2.45	$2.25	2.10	2.25	3.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	4.00	....	....	....	....
(4) Crushed Stone	per ton	....	....	....	....	3.25	....	....	....	....	....	....
(5) Crushed Stone	per yd.	2.75	7.00	5.75	....	....	2.75*	3.15	....	....	....	4.25
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	25.50	18.00*	18.00	19.00	18.00	14.50	18.00	23.00	15.00	16.00	18.50
(7) Corner Bead, galvanized	per ft.	.07	.05	.07	.05	.06	.06	.05	.07	.07	.06	.045
(8) Drain Tile, 4 in.	per ft.	.10	....	....	.045	.08	.055	.08	.07	.075	....	..13
(9) Drain Tile, 6 in.	per ft.	....	....	....	.084	.12	.09	.14	.15	.12	....	.18
(10) Flue Lining, 8½ in x 8½ in.	per ft.	.40	.40	.45	.27	.39	.34	.30	.30	.30	....	.44
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.60	.50	.58	.405	.58	.51	.45	.40	.42	....	.65
(12) Fire Brick, Standard 9-in. No. 1 clay	per M.	85.00	80.00*	76.00	70.00	70.00	62.00	63.00	80.00	61.10	90.00*	65.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	40.00*	20.00	40.00	15.00*	25.00	16.00*	23.00*	20.00*	15.98	....	17.50*
(14) Gravel, washed	per yd.	....	....	....	....	3.65	3.25	2.25	....	3.30	....	3.75
(15) Hollow Building Tile (8x12x12 in)	per M.	280.00	280.00	230.00	227.40	198.00	190.00	250.00*	....	220.00	240.00	236.60*
(16) Hollow Building Tile (8x5x12 in)	per M.	160.00	120.00	120.00	101.10	100.00*	100.00	111.20	116.00	....	90.00	103.10*
(17) Hydrated Lime (masons) in 50-lb. paper bags	per bag	.75	.60*	.80	.50	.75	.50	.55	.62	.53	.60	.50*
(18) Hydrated Lime (finishing) in 50-lb. paper bags	per bag	.85	.75*	.80	.65	.75	.60	.70	.62	.62	....	.50*
(19) Hair	per bu.	1.00	.75	.75	75	....	.60	.55	.50	.56	....	85
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.38*	.45	.52	.45	.35	.35	.40	.40	.38	.37	.371
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	.38*	.31*	.42	....	.35	....	....	.42	.38	.40*	....
(22) Mortar Color, red	per lb.	.055	.04	.04	.035	.03	.02	.05	.05	.05	.035*	.0325
(23) Mortar Color, buff	per lb.	.06	.04	.06	.045	....	.03	.08	.025	.05	.0375*	.04
(24) Mortar Color, double strength black	per lb.	.08	.07	.06	.06	....	.045	.16	.08	.06	.045*	.0475
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	....	....	101.10	100.00	110.00	111.20	170.00	126.90	120.00	128.00*
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	....	160.00	113.70	111.00	120.00	125.10	138.50	131.60	120.00	133.70*
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	....	....	....	....	....	.1375	.20	.12	.125	.13
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	....	....	....	....	....	.165	.25	....	....	.165
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	4.12	3.20	3.60	2.70	4.08	3.20	4.00	3.90	3.20	3.50	3.35
(30) Extra charge for each cloth sk.	per sk.	.07	.10	.05	.10	.08	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	....	....	....	....	34.00	40.40	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	60.00*	40.00	41.00	50.00	65.00	52.50*	44.00	65.00	41.36	....	60.00
(33) Sand (Building)	per ton	....	....	1.00	....	3.75	....	....	1.85	....	1.75	1.75
(34) Sand (Building)	per yd.	1.60	3.50	1.40	....	4.50	2.17	3.00	1.85	1.88	1.75	1.75
(35) Sewer Pipe, single strength, off list	per cent.	*	30%*	*	55%	45%	....	50%	30%	*	....	*
(36) Wall Coping, 9 in.	per ft.	....	....	....	55%	45%	.23	.20	.25	.16	....	.31
(37) WallCoping, 13 in.	per ft.	....	....	....	55%	45%	.32	.30	.35	.23	....	.44
(38) Wall Plaster, neat, in paper, in 80-lb. bags	per ton	....	22.00	....	....	....	....	....	24.00	....	16.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. sks., inc. sks.	per ton	29.00	24.00	26.50	25.00	27.00	24.00*	27.00	24.00*	22.36	18.00*	25.00*
(40) Wall Plaster, sanded, in cloth, 100-lb., inc. sks	per ton	....	....	....	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloth, 100-lb., inc. sks.	per ton	29.00*	24.00	26.50	25.00	....	24.00*	....	26.00*	....	18.00*	....
(42) Wall Ties, galvanized	per M.	5.00	4.00	5 00	4.00*	4.50	4.50	5.00	4.50	4.75	4.10*	5.25*
(43) Wall Plugs	per M.	....	....	....	30.00	....	18.50	22.50	....	....	....	30.00
(44) Asphalt Shingle (*singles; †stripped)	per sq.	10.00	8 00*	8.00†	6.25	....	7.00*	7.50*	9.15	7.00	....	10.00
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	4.00**	3.25	3.50†	3.00†	4.00*	2.60†	3.00†*	4.00	3.00	4.50*	4.00**
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.50§	3.50§	3.25§	3.25†	3.75§	2.85§	2.85§*	3.00	2.50	4.25§	3.50§*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	65.00*	....	60.00	....	....	....	60.00	....	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	9.50*	....	....	....	....	....	....	....	....	....
LUMBER ITEMS		*					*	*	*		*	*
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	11.00*	9.50*	10.00*	....	....	6.50*	7.25	7.00	6.35	9.00	6.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	35.00	32.00	....	....	....	30.00	42.50	36.00	33.00	47.50	37.50*
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	90.00	60.00	....	....	....	....	50.00	70.00	45.00	50.00	40.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	40.00	35.00	....	....	....	32.50	40.00	49.00	....	40.00	28.00
(53) 1x4 No. 2 Sheathing	per M. Board ft.	40.00	30.00	....	....	....	30.00	40.00	35.00	25.00	40.00	25.00
(54) 1x4 "B" Flooring	per M. Board ft.	65.00	55.00	....	....	....	60.00	55.00	60.00	55.00	58.50	50.00
(55) Yellow Pine Clear Finish	per M. Board ft.	80.00	80.00	....	....	....	75.00	90.00	80.00	....	80.00	65.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	65.00	55.00	....	....	....	....	80.00	70.00	65.00	....	50.00
(57) 1x6 No. 1 Common Drop Siding	per M Board. ft.	55.00	45.00	....	....	....	50.00	37.50	55.00	45.00	55.00	40.00
(58) Cypress Finish Lumber	per M. Board ft.	180.00	150.00	....	....	....	150.00	175.00	....	150.00	....	150.00*
(59) ¾x4 "B" Partition	per M. Board ft.	70.00	60.00	....	....	....	60.00	60.00	70.00	55.00	80.00	70.00
(60) ½x4 "B" Ceiling	per M. Board ft.	50.00	50.00	....	....	....	55.00	52.50	60.00	55.00	....	40.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	80.00*	80.00	....	....	....	....	....	....	....	....	65.00*
(62) Mouldings, Yellow Pine	over list	1.25	1.25	....	....	....	*	10%	1.00	....	25%	*
(63) Washington 16 in., 5/2 Clears	per M.	9.50	....	....	....	....	7.50	6.50	8.00	....	....	7.00
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	....	6.25
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	....	....	....	8.75	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Yellow Pine Boards	per M	90.00	60.00*	....	....	....	60.00	....	60.00	54.00	50.00	40.00*

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime (Item No. 1, bulk)—Nashville, 80 lb. bu. Lexington, 70 lbs.; Houston c/L f. o. b. Houston. **Barreled Lime,** (Item 2 and 3), Louisville, blue river lime. **Hydrated** (Items 17, 18)—Tampa, 40 lb. bags, Florida lime, 60c; Houston, 40 lb. bags.

Crushed Stone (Item 4-5)—Memphis, f. o. b. cars, per ton.

Common Brick (Item 6)—Tampa, Ala. and Ga. Red.

Fire Brick (Item 12)—Carload lots, El Paso; Tampa. $60.00 to $80.00.

Fire Clay (Item 13)—15c credit, Nashville; no credit, Louisville, Birmingham, Houston, Miami, Memphis.

Hollow Building Tile (15, 16)—Houston, Interlocking tile, $134.00 per M; Lexington, f. o. b. cars; Nashville, load bearing; Houston, car loads.

Metal Lath (Item 21)—El Paso, Gauge No. 27: Miami, Gauge 26, galvanized per sq. yd.; (Item 20)—Blk. Painted Exp. Key Lath, Gauge 27, El Paso; Tampa, Gauge 27.

Mortar Color (Item 22, 23, 24)—El Paso, barreled lot price.

Partition Tile Clay (Items 25, 26)—Houston, mfrs. price.

Plaster Board (Item 32)—Miami, Memphis, ¼ inch.

Sewer Pipe (Item 35)—St. Petersburg, net; Houston, various per cent. off list; New Orleans, Miami, list; Tampa, less.

Wall Plaster (38, 39, 40, 41)—15c sacks, Birmingham, El Paso, Memphis, Miami; hair fibre. Houston, gross ton, 15c sacks.

Wall Ties (42)—Corrugated, El Paso. Louisville, Houston.

Roofing, Slate Surf. (Item 45)—85 lbs. Miami, Nashville, Houston.

Roofing, Smooth Surf. (Item 46)—55 lbs., Nashville, Houston.

Stucco Board (Item 47-48)—Tampa, creosoted.

(Item 49)—Memphis, yellow pine; Miami, Houston, Tampa, St. Petersburg, cypress; **(Item 50)**—Houston, 20 ft. average; **(Item 58)**—Houston, $115.00 to $300.00. **(Item 61)**—Houston, pine; Miami cypress; **(Item 62)**—Memphis Houston, list; **(Item 67)**—Houston, 6 in., 8 in. and 10 in., $45.00, 12 in., $55.00; Tampa, $60.00 to $80.00.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

SOUTHWESTERN AND CENTRAL STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

		Dallas, Tex.	Topeka, Kan.	Little Rock, Ark.	Okla. City Okla.	Cincinnati, O.	Cleveland	Columbus	Toledo	Detroit, Mich.	Evansville, Ind.
(1) Bulk Lime	per cwt.	....	....	....	$1.10	$1.05	$1.10	$0.50	$0.95	$0.85	$0.90
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$2.75	$3.25	$3.00	3.25	3.25	3.45	2.50	....	....	2.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	....	....	....	3.60	2.90*	3.60	3.00*	3.50	3.00	....
(5) Crushed Stone	per yd.	....	....	....	....	....	4.50	...	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	20.00	35.00	12.50*	18.00	18.00*	15.00	18.00	16.50	17.00	14.00
(7) Corner Bead, galvanized	per ft.	.475	....	.06	.07	.06	.06	.05	.04	.03	.04
(8) Drain Tile, 4 in	per ft.	.15	.065	.10	.10	.0708	.047	.055	.06	.06	.03
(9) Drain Tile, 6 in	per ft.	.20	.11	.15	.05	.125	.076	.09	.089	.12	.045
(10) Flue Lining, 8½ in. x 8½ in	per ft.	.45	.55	.55	.40	.33	55%*	.275	50%*	.27	.32
(11) Flue Lining, 8½ in. x 13 in	per ft.	.65	.80	.70	.55	.495	55%*	.40	50%*	.405	.48
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	80.00	....	80.00	70.00	63.00	55.00	65.00	50.00	70.00	60.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	28.00	....	25.00*	25.00	.83‡*	12.00*	.85*	11.00	11.00	15.00
(14) Gravel, washed	per yd.	....	....	....	3.25*	2.75*	....	1.25*	2.25	3.50	1.80
(15) Hollow Building Tile (8x12x12 in.)	per M.	257.00	300.00	....	....	142.50	142.00	174.10	....	186.60	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	112.50*	115.00	....	93.00	68.00	58.00	....	85.00	79.00	70.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.60*	.65	.75	.75	.49	.38	.40	.48	.40	.60
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.50*	....	.75	.75	.55	.43	.45	.50	.45	.60
(19) Hair	per bu.	.75	....	1.00	....	.55	.75	.75	.75	.20*	.60
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.362	.40	.45	.466	.35	.40	.40	.36	.38	.35
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	....	....	.46	....	....	.35*	....	.40	....	.34
(22) Mortar Color, red	per lb.	.04*	.06	.03	.03	.025	.0215	.025	.04	.03	.025
(23) Mortar Color, buff	per lb.	.04*	.06	.045	.04	.036	.0315	.03	.04	.05	.03
(24) Mortar Color, double strength black	per lb.	.095	....	.05	.07	.065	.049	.05	.05	.06	.055
(25) Partition Tile, Clay (3x12x12 in.)	per M.	135.00	130.00	140.00	....	72.00*	65.00	86.35	110.00	100.35	77.50
(26) Partition Tile, Clay (4x12x12 in.)	per M.	145.00*	....	160.00	....	90.00*	74.00	92.90	125.00	97.70	80.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	.13	....	....	....	.17	.17	.135	.145	.16	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.1525	....	....	....	.18	.21	.18	.17	.185	....
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	3.20	3.40	4.20	3.80	3.28	2.80	3.00	3.28	3.00	2.80
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.10	.10	.10	.10	.08	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	....	....	....	40.00	45.00*	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	65.00*	45.00	35.00	45.00	50.00	33.75	37.50	.30*	31.00	40.00
(33) Sand (Building)	per ton	....	....	....	2.60	2.25*	2.75	3.50	2.25	3.50	....
(34) Sand (Building)	per yd.	4.00	....	1.00*	....	2.30*	....	3.50	....	....	1.80
(35) Sewer Pipe, single strength, off list	per cent.	20%	....	....	....	43%	52%	50%	50%	50%	50%
(36) Wall Coping, 9 in	per ft.	.30	....	.35	.37	.228	55%*	45%*	50%*	45%*	.22
(37) Wall Coping, 13 in	per ft.	.45	....	.45	.40	.342	55%*	45%*	50%*	45%*	.32
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	....	....	20.00	23.25	20.00	17.00	....	18.75	....
(39) Wall Plaster, neat, in cloth, 100 lb. sacks, including sacks	per ton	21.00	21.00	27.00*	22.00	25.00	22.00*	....	....	19.00*	23.00
(40) Wall Plaster, sanded, in cloth, 100 lb., including sacks	per ton	....	....	....	....	....	12.50	16.00*	13.00*	13.00*	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb., including sacks	per ton	21.50	....	27.50*	22.00	25.00	22.00	....	15.60‡	19.00*	23.00
(42) Wall Ties galvanized	per M.	4.00	....	4.75	4.00	4.75	3.60	2.50	4.00	3.00	2.50
(43) Wall Plugs	per M.	22.50	....	25.00	30.00	....	....	....	15.00	....	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	10.00	8.50	8.50*	7.00*	8.50*	6.25*	7.00†	7.00†	5.50†	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	4.50*	4.00**	3.40†	3.50†	....	2.85†	3.00†	3.10†	3.00**	2.75
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	4.25§	4.00§	3.00§	3.00§	....	2.90§	2.10†	2.75§	2.40§*	2.75§*
(47) Stucco Board, Medium wt	per M. sq. ft.	....	....	....	....	....	60.00	60.00	60.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	....	....	....	60.00	70.00	60.00	60.00	....
LUMBER ITEMS			*	*				*		*	
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	10.50*	10.00	6.00	....	7.75	12.50*	9.00*	12.00*	12.00	7.50*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	37.50	40.00*	32.00	....	....	47.00	42.50	41.00	45.00	40.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	40.00	40.00	40.00	....	....	47.00*	....	....	70.00	50.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	27.50	40.00	27.00	....	....	40.00*	42.50	36.00	45.00	37.50
(53) 1x4 No. 2 Sheathing	per M. Board ft.	25.00	40.00	23.00	....	....	47.00	37.50	32.00	40.00	35.00
(54) 1x4 "B" Flooring	per M. Board ft.	47.50	60.00	45.00	....	....	81.00*	65.00	65.00	75.00	60.00
(55) Yellow Pine Clear Finish	per M. Board ft.	65.00	90.00	70.00	....	....	95.00	90.00	85.00	135.00	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	47.00	55.00	45.00	....	....	70.00	60.00	....	....	65.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	42.50	....	40.00	....	....	63.00	50.00	55.00	50.00*	50.00
(58) Cypress Finish Lumber	per M. Board ft.	170.00	140.00	....	....	....	122.00	140.00	110.00	160.00	150.00
(59) ¾x4 "B" Partition	per M. Board ft.	65.00	....	50.00	....	....	95.00	65.00	65.00*	75.00	75.00
(60) ½x4 "B" Ceiling	per M. Board ft.	50.00	50.00*	40.00*	....	....	63.00*	55.00	50.00	65.00	50.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	65.00*	60.00	50.00*	....	....	63.00	55.00	55.00	70.00	60.00
(62) Mouldings, Yellow Pine	over list	*	....	25%	....	....	1.30*	1.25	1.10*	1.25	25%
(63) Washington 16 in., 5/2 Clears	per M.	6.25	5.50	....	....	....	7.70	6.50	6.50	7.00	6.00
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	4.80
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	8.00	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	50.00	65.00	....	....	....	63.00	60.00	60.00	70.00	50.00

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime, Hydrated (Item 17, 18)—Dallas, 40 lb. bags.

Crushed Stone (4)—Columbus, f. o. b. tipple stone at quarries; Cincinnati, bowlders.

Common Brick (6)—Little Rock, Cincinnati, f. o. b. cars.

Flue Lining (10, 11)—Per cent. off list, Toledo, Cleveland.

Fire Clay (Item 13)—Cincinnati, Cleveland, paper; Columbus, price per sack; single sack rate, no credit on returned sacks, Little Rock.

Gravel (14)—Columbus, tipple, per ton; Cincinnati, Okla. City, per ton.

Hollow Building Tile (Item 15-16)—Dallas (Item 16), Interlocking Tile, $125.00 per M.

Hair (19)—Detroit, per lb.;

Metal Lath (Item 21)—Cleveland, Gauge No. 26.

Mortar Colors (Items 22-23-24) Dallas, paste.

Partition Tile, Clay (25, 26)—Cincinnati, carload lots, f. o. b. cars; Dallas, mfrs. price.

Paving Block (Item 31)—Toledo No. 2 quality.

Plaster Board (Item 32)—Per sheet, 32x36 ft., ⅜ in. thick, Toledo; Dallas, sheetrock.

Sand (33, 34)—Cincinnati (33) concrete and (34) fine; Little Rock, f. o. b. yard.

Wall Coping (36, 37)—Per cent. off list, Toledo, Detroit, Columbus, Cleveland.

Wall Plaster (39, 40, 41)—Returned sacks, 15c, Cleveland, Little Rock; sacks, 12c each, Detroit; Columbus, 80 lb. paper; Toledo, 8c sacks.

Roofing, Slate Surf. (Item 45)—85 lbs., Topeka; 80 lbs. Detroit.

Roofing, Smooth Surf. (Item 46)—55 lbs., Detroit, Evansville.

(Item 49) — Dallas, Cypress; Cleveland, white pine; Toledo, hemlock; Evansville, pine; Columbus, chestnut. **(Item 50)**—Topeka, white pine; **(Item 51)**—Cleveland, No. 2 Commercial; **(Item 52)**—Cleveland, No. 3; **(Item 54)**—Cleveland, No. 1 C.; **(Item 57)**—Detroit, No. 2. **(Item 59)**—Toledo, Select Com. Cypress D4S; **(Item 60)**—Cleveland, ⅝ in.; Little Rock, ⅝x4 in.; Topeka, ⅝ inch only. **(Item 61)**—Little Rock, Y. P.; Dallas, Cypress; **(Item 62)**—Cleveland, Toledo, per 100 inches; Dallas, white pine, list.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

		INDIANA				ILLINOIS			
Item	Unit	Ft. Wayne††	Indianapolis	South Bend	Terre Haute	Bloomington, Ill.	Chicago	Moline	Peoria
(1) Bulk Lime	per cwt.	$2.70*	$0.90	$2.35*	....	....	$1.40	$0.80	....
(2) Barreled Lime, 180 lbs. (net) bbls.	per bbl.	....	....	2.75	....	$2.75	2.40	1.80	$2.75
(3) Barreled Lime, 280 lbs. (net) bbls.	per bbl.	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	4.50	....	$3.00	4.00	....	....	....
(5) Crushed Stone	per yd.	....	4.50	....	....	....	2.75	3.75	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	18.00	17.00	20.00	18.00	22.00	12.00	19.00	16.00
(7) Corner Bead, galvanized	per ft.	.06	.05	.06	.06	.06	.04	.06	....
(8) Drain Tile, 4 in.	per ft.	.05	.06	....	....	.05	.06	.085	.0697
(9) Drain Tile, 6 in.	per ft.	.07	.12	.04	....	.09	.10	.12	.12
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.36	.70	.33	.325	.35	.27	.40	.40
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.54	1.05	.495	.50	.55	.40	.45	.50
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	70.00	70.00	55.00	60.00	75.00	80.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	13.00*	11.00	15.00*	15.00*	20.00*	22.00*	16.00	15.00
(14) Gravel, washed	per yd.	....	....	2.15	3.00*	4.45*	2.75	3.15	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	....	....	240.00	....	....	150.00	....	126.00
(16) Hollow Building Tile (5x8x12 in.)	per M.	95.00	85.00	115.00	....	100.00	75.00	70.00	63.75
(17) Hydrated Lime (masons) in 50-lb. paper bags	per bag	.65	.50	.525	.50	.65‡	.40	.525	.50
(18) Hydrated Lime (finishing) in 50-lb. paper bags	per bag	.65	.60	.56	.60	.65‡	.45	.625	.57
(19) Hair	per bu.	.80	.40	.37	....	....	.50	.80	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.44	....	.32	.40	....	.30	.38	.61
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	.42*	....	.30	.30	.35	.29	.38	....
(22) Mortar Color, red	per lb.	.03*	.03*	.05	.04	.05	.05*	.05	.03
(23) Mortar Color, buff	per lb.	.04*	.04*	.03	.04	.05	.05*	.055	.04
(24) Mortar Color, double strength black	per lb.	.06*	.06*	.06	.05	.07	.05*	.07	.06
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	96.00	80.00	....	....	75.00	....	....
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	110.00	85.00	....	....	80.00	....	72.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	.153	....	....	....	.12	.14	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	.191	....	....	....	.14	.16	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.40	3.60*	3.20	3.00	3.20	2.45	2.80	3.20
(30) Extra charge for each cloth sk.	per sk.	.25	.07	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	50.00	....	50.00	....	....	....	38.00	35.50*
(32) Plaster Board, ⅜-in. thick	per M. sq. ft.	50.00	40.00	37.50	45.00	45.00	30.00	45.00	50.00
(33) Sand (building)	per ton	3.00*	....	....	....	3.50	....	....	....
(34) Sand (building)	per yd.	....	3.00	2.15	3.00*	4.00*	2.50	2.05	....
(35) Sewer Pipe, single strength, off list	per cent.	40%	40%	45%	50%	40%	55%	42%	20%
(36) Wall Coping, 9 in.	per ft.	.26	.25	.22	50%*	.25	.18*	.27	.25
(37) Wall Coping, 13 in.	per ft.	.39	.40	.27	50%*	.35	.27*	.36	.35
(38) Wall Plaster, neat, in paper, in 80-lb. bags	per ton	22.50	21.25	21.00	20.00	20.00	....	20.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. incl. sks.	per ton	....	23.00‡	23.00‡	23.00	23.00*	18.00*	19.00	22.70
(40) Wall Plaster, sanded, in cloth, 100-lb. incl. sks.	per ton	....	12.00‡	....	....	23.00	15.00	....	16.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb. incl. sks.	per ton	23.75*	22.50‡	21.00‡	23.00	23.00*	18.50*	20.00	22.70
(42) Wall Ties, galvanized	per M.	4.75	3.00	3.75	3.50	5.00	3.25	4.00	4.00
(43) Wall Plugs	per M.	30.00	25.00	25.00	....	10.00	23.00	23.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	7.00†	8.50	7.00	7.00*	8.00*	7.00*	7.50	7.50*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.25†	3.25*	3.50	3.50*	3.75**	3.00	3.50*	3.25†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.00§	3.25§	2.50	3.00§	3.50**	....	3.25§	2.75§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	55.00	60.00	60.00	55.00	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	60.00	....	....	60.00	....	....
LUMBER ITEMS		*		*		*		*	
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	7.00*	11.25	12.00	12.00	12.50*	....	9.00	14.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	47.00	35.00	42.50	47.00	45.00	....	43.00	48.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	55.00	50.00	65.00	60.00	60.00	....	56.00	50.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	42.00	40.00	45.00	45.00	40.00	....	42.00	45.00
(53) 1x4 No. 2 Sheathing	per M. Board ft.	40.00	35.00	42.50	40.00	40.00	....	40.00	45.00
(54) 1x4 "B" Flooring	per M. Board ft.	70.00	60.00	70.00*	78.00	65.00	....	75.00	71.00
(55) Yellow Pine Clear Finish	per M. Board ft.	100.00	125.00	90.00*	90.00	75.00	....	88.00	86.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	70.00	60.00	....	70.00	65.00	....	65.00	67.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	65.00	52.50	62.00	60.00	65.00	....	57.00	....
(58) Cypress Finish Lumber	per M. Board ft.	150.00	150.00	150.00	170.00	135.00	....	165.00	136.00
(59) ¾x4 "B" Partition	per M. Board ft.	85.00	60.00	80.00	70.00	75.00	....	75.00	77.00
(60) ½x4 "B" Ceiling	per M. Board ft.	65.00	52.50	....	60.00	50.00	....	60.00	67.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	65.00	60.00	60.00	60.00	60.00	....	54.00	72.00
(62) Mouldings, Yellow Pine	over list	50%	20%	....	25%	10%	....	25%	....
(63) Washington 16 in., 5/2 Clears	per M.	6.50	7.00	7.00	7.00	7.00	....	6.00	7.00
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	7.25	....	....	....	7.00	....	....	7.00
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq	....	....	7.00	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	65.00*	55.00	62.00	65.00	60.00	....	56.00	60.00*

††Ft. Wayne—5% discount to contractors and manufacturers for payment on or before 10th of month following purchase, except shingles, roofing and common brick, on which regular 2% discount will be allowed.

*(Above Item 49)—No !umber revisions received for this issue from this city.

‡Means no cloth bags used.

Lime (bulk, Item 1) — Ft. Wayne, price of three 70 lb. sacks; South Bend, 5% discount c. l. only; per bbl., 200 lb., Chicago.

Fire Clay (13)—Returned sacks 15c, South Bend, Bloomington; sacks 25c, Ft. Wayne; paper sacks, Chicago; paper sacks, Terre Haute.

Gravel (14)—Terre Haute, 3000 lb. yd.; Bloomington, 2500 lb. yd.

Metal Lath (Item 21)—Ft. Wayne, Gauge 26.

Mortar Color (22, 23, 24)—Ft. Wayne, in 100 lb. sacks, broken 1c more; Indianapolis, Chicago, 100 lb. lots.

Portland Cement (Item 29)—Indianapolis, less 5 per cent. for cash.

Paving Block (Item 31)—Peoria, 3x4x8½ in.

Sand (33, 34)—Terre Haute, 2600 lb. yd.; Bloomington, 2500 lb. yd.; Ft. Wayne, washed.

Wall Coping (36, 37)—Per cent. off list, Terre Haute; Chicago, double slant.

Wall Plaster (38, 39, 40, 41)—Returned sacks, 15c, Bloomington, Chicago; Fort Wayne, paper.

Roofing, Slate Surf. (Item 45)—85 lbs., Bloomington.

Roofing, Smooth Surf. (Item 46)—60 lbs., Bloomington.

(Item 49)—Bloomington, Peoria, cypress; Ft. Wayne, yellow pine; **(Item 54)**—South Bend "B & Btr." **(Item 55)**—South Bend, Rough. **(Item 67)**—Ft. Wayne, $60.00 to $70.00; Peoria, 6, 8 and 10 in., $50.00; 12 in., $60.00.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

NORTH CENTRAL STATES

Item	Green Bay, Wis.	Milwaukee	Minneapolis St. Paul, Minn.	Davenport, Ia.	Des Moines	Sioux City	Kansas City,★ Mo.	St. Louis, Mo.	Lincoln, †† Neb.	Denver, Colo.
(1) Bulk Lime ... per cwt.	$2.00	$1.60	$1.80*	$2.00	....	$1.30*	$1.00	$0.70	....	$1.00*
(2) Barreled Lime, 180 lbs. (net) bbls ... per bbl.	....	2.00	2.80*	3.50	$2.985	2.25	2.80	2.50	$2.75	3.10*
(3) Barreled Lime, 280 lbs. (net) bbls ... per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone ... per ton	2.75	2.50*	....	....	4.50	4.80	....	2.30	3.50*	....
(5) Crushed Stone ... per yd.	....	....	....	3.00	....	....	....	2.83	4.73*	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾) ... per M.	14.00	16.50*	18.00	20.00	22.00	19.50	22.00	17.00*	17.00*	14.00
(7) Corner Bead, galvanized ... per ft.	.05	.05	.04	.05	.04	.045	.05	.0375	.05	.05
(8) Drain Tile, 4 in ... per ft.	.04	.06	.07	.07	.08	....	....	.08	.08	.08
(9) Drain Tile, 6 in ... per ft.	.055	.08	.09	.11	.10	....	.0625	.14	.10	....
(10) Flue Lining, 8½ in. x 8½ in ... per ft.	.33	.30	.35	.35	.40	.32*	.27	.272	.40	....
(11) Flue Lining, 8½ in. x 13 in ... per ft.	.495	.45	.50	.50	.575	.50*	.40	.408	.60	....
(12) Fire Brick, Standard 9 in. No. 1 Clay ... per M.	55.00*	70.00	65.00	58.00	67.50	70.00*	55.00	47.00	62.50	35.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags ... per ton	15.00*	20.00	12.00	15.00	16.00*	20.00*	10.00	13.50	25.00	9.50
(14) Gravel, washed ... per yd.	2.40*	2.25*	2.25	2.10	2.15*	3.50	4.50	2.40*	....	2.00
(15) Hollow Building Tile (8x12x12 in.) ... per M.	225.00	160.00	....	....	....	201.00	....	....	....	....
(16) Hollow Building Tile (8x5x12 in.) ... per M.	107.00	120.00	100.00	123.00	85.00	90.00	100.00	85.00	73.50	85.00
(17) Hydrated Lime (masons) in 50 lb. paper bags ... per bag	.50	.50	.55	.60	.605	.75	.70	.50	.6875	.55
(18) Hydrated Lime (finishing) in 50 lb. paper bags ... per bag	.75	.60	.75	.65	.75	....	.76	.65	.6875	.80
(19) Hair ... per bu.	.75	.60	1.00	.75	.60	.75	.35	.65	.75	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡ ... per yd.	.30	.31	.32	.355	.44	.351	.35	.345	.43	.3619
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs ... per yd.	.28	.35*	.31	....	....	2885*	.32*	.32	....	.3328*
(22) Mortar Color, red ... per lb.	.05	.03	.035	.045*	.045	.03	.025	.025	.04	.0495
(23) Mortar Color, buff ... per lb.	.05	.035	.035	.045*	.045	035	.0325	.035	.045	.05
(24) Mortar Color, double strength black ... per lb.	.06	.055	.06	.12	.055	.04	.035	.04	.085	.10
(25) Partition Tile, Clay (3x12x12 in.) ... per M.	....	95.00	95.00	....	140.00	....	125.00	91.00	....	....
(26) Partition Tile, Clay (4x12x12 in.) ... per M.	100.00	100.00	105.00	....	150.00	108.00	140.00	97.00	....	....
(27) Partition Tile, Gypsum (3x12x30 in.) ... per ft.	*	.15	.1575	....	.14	.1025	....	.15	.145	.125
(28) Partition Tile, Gypsum (4x12x30 in.) ... per ft.	*	.17	.1725	....	.17	.1275	....	.185	.165	.15
(29) Portland Cement, 4 sacks to bbl. (excluding sks.) ... per bbl.	2.80	2.60	2.70	3.00	3.26	2.80	3.20	2.95	3.60	3.80
(30) Extra charge for each cloth sk ... per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(31) Paving Block, Vitrified (3½x4x8½ in.) ... per M.	....	....	....	45.00	35.50	....	....	....	....	....
(32) Plaster Board, ⅜ in. thick ... per M. sq. ft.	3.50	32.50	37.00	58.00	35.50	36.00	36.50	55.00	35.00	37.25
(33) Sand (Building) ... per ton	2.40	2.00	....	....	1.35	2.20	....	2.40	2.00	1.60
(34) Sand (Building) ... per yd.	....	2.10	....	1.50	1.35*	3.10	....	3.24	2.70	1.60
(35) Sewer Pipe, single strength, on list ... per cent	50%*	50%*	....	....	....	40%	....	37%	....	....
(36) Wall Coping, 9 in ... per ft.	.22	.25	.30	.25	.43	.27	.1875	.18	.35	....
(37) Wall Coping, 13 in ... per ft.	.33	.35	.40	.34	.59	.26	.255	.27	.45	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags ... per ton	19.00	....	....	....	20.80	17.00	....	22.00	18.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks ... per ton	20.00	21.00*	16.00*	22.00*	20.00*	20.50*	20.00*	24.00*	21.00	20.00
(40) Wall Plaster, sanded, in cloth, 100 lb., inc. sks ... per ton	20.00	14.50*	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloh, 100 lb., inc. sks ... per ton	20.00	21.00*	16.50*	....	22.80*	21.00*	....	21.00*	21.50*	....
(42) Wall Ties, galvanized ... per M.	5.25	4.00	3.50	7.00	4.25	3.00	3.50	3.25	4.00	6.00
(43) Wall Plugs ... per M.	....	....	....	16.50	31.00	17.75	....	16.50	20.00	30.00
(44) Asphalt Shingle (*singles, †stripped) ... per sq.	6.60*	....	6.50	8.00*	6.30†	8.00†	....	7.50	7.75**	10.00
(45) Roofing Slate Surf. (*heavy, †extra heavy) ... per sq.	2.75**	....	3.25	3.50*	2.70	....	....	....	....	3.75*
(46) Roofing Smooth Surf. (*light, †medium, §heavy) ... per sq.	2.85§*	....	2.75†	2.85§	1.80**	....	....	3.50§*	4.00§*	3.00*
(47) Stucco Board, Medium wt ... per M. sq. ft.	....	55.00	60.00*	65.00	49.50	....	....	....	....	....
(48) Stucco Board, Narrow Key ... per M. sq. ft.	....	60.00	60.00*	70.00	49.50	....	....	....	....	60.00
LUMBER ITEMS	*	*	*	*			*	*		*
(49) Wood Lath, No. 1 (size 4 ft.) ... per M.	12.00	10.00	10.50*	9.00	9.00*	10.00	8.00	7.50	....	9.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft ... per M. Board ft.	40.00	45.00	45.00*	40.00	39.60	40.00*	40.50	40.00	....	34.00*
(51) 1x10 No. 1 Shiplap, Y. P., all lengths ... per M. Board ft.	....	50.00	101.00	53.00	46.80	40.00	47.50	45.00	....	52.50
(52) 1x10 No. 2 Shiplap, Y. P., all lengths ... per M. Board ft.	38.00	40.00	80.00	40.00	37.80	....	37.00	38.00	....	....
(53) 1x4 No. 2 Sheathing ... yer M. Board ft.	....	35 00	73.00*	38.00	40 00	35.00	33.50	30.00	....	41.00
(54) 1x4 "B" Flooring ... per M. Board ft.	....	70.00	90.00*	89.00	58 50*	90.00*	60.00	52.50	....	75.00
(55) Yellow Pine Clear Finish ... per M. Board ft.	80.00	90 00	105.00	88.00	81.00	100.00	75.00	75.00	....	90.00
(56) 1x6 "B&Btr" Drop Siding ... per M. Board ft.	....	70.00	72.00*	65.00	48.60	65.00*	55.00	55.00	....	47.00
(57) 1x6 No. 1 Common Drop Siding ... per M. Board ft.	....	60.00	93.00	58.00	60.00	....	52.50	48.00	....	....
(58) Cypress Finish Lumber ... per M. Board ft.	125.00	130.00	....	165.00	126.00	125.00*	120.00	125 00*	....	....
(59) ⅝x4 "B" Partition ... per M. Board ft.	65.00	70.00	69.00	80.00	70.00	60.00*	60.00	58.00	....	45.50
(60) ½x4 "B" Ceiling ... per M. Board ft.	50.00	65.00	....	60.00*	55.00	50.00	50.00	48.00	....	37.50
(61) ½x5 Clear Rdwd. Bevel Siding ... per M. Board ft.	55.00	65.00	65.00	56.00	54.00	60.00	55.00	44.00	....	62.50
(62) Mouldings, Yellow Pine ... over list	40%	1.00	50.90	*	25%	25%	25%	....	....	15%
(63) Washington 16 in., 5/2 Clears ... per M.	6.00	6.00	6.65	6.50	6.75	5.50	6.00	5.75	....	4.75
(64) Washington 16 in., 5/2 Clears ... per sq.	....	5.75	7.25	5.75	....	....	....	....	....	6.00
(65) Canadian 16 in., 5/2 xxxxx Clears ... per M.	....	....	....	6.00	7 50	....	....	....	....	6.00
(66) Canadian 16 in., 5/2 xxxxx Clears ... per sq.	....	....	....	5.25	....	....	....	....	....	6.00
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards ... per M.	42.00	50.00	92.00*	56.00	46.80*	40.00	56.00*	45.00	....	42.00*

*(Above item 49)—No lumber revisions received for this issue from this city.

††Lincoln, all prices less 5 per cent cash 10th of month.

Lime (Item No. 1, bulk)—Per 80 lb. bu., Denver, Sioux City, hydraulic; Minneapolis and St. Paul, per 180 lbs. (Barreled, Items 2, 3) Minneapolis and St. Paul, headed; Denver 200 and 400 lbs.

Crushed Stone (4, 5)—Lincoln, 1 in. and chips; Milwaukee, net.

Common Brick (Item 6)—St. Louis, hard common. Milwaukee, another quotes $14.50; Lincoln, Nebr., price for 1st zone, $18.00 2nd zone.

Flue Lining (10, 11)—Sioux City, f. o. b. yard.

Fire Brick (12)—Sioux City, f. o. b. yard; Green Bay, high grade.

Fire Clay (13)—Sacks not included, Des Moines, Sioux City; 5c, Green Bay.

Gravel (14)—Des Moines, 3000 lb. yard; Milwaukee, St. Louis, Green Bay, per ton.

Metal Lath (Item 21)—Milwaukee, Gauge No. 27; Denver, Kansas City, Gauge No. 26; Sioux City, Gauge 27, 2.3 lbs.

Mortar Color (22, 23, 24)—Davenport, discount in quantities.

Partition Tile, Gypsum (Item 27, 28)—Green Bay, prices quoted at time of delivery.

Sand (34)—Des Moines, 3000 lb. yd.

Sewer Pipe (35) — Milwaukee 3x12 in.; Green Bay, 3 in. to 24 in. inc.

Wall Plaster (39, 40, 41)—Returned sacks 15c, Milwaukee, St. Paul, Davenport, Des Moines, Sioux City, St. Louis, Lincoln; sacks, 15c, Kansas City.

Asphalt Shingle (Item 44)—Lincoln, Standard wt.

Roofing, Slate Surf. (Item 45)—85 lbs., Green Bay.

Roofing, Smooth Surf. (Item 46)—60 lbs., Green Bay; 55 lbs., Des Moines, St. Louis, Lincoln.

Stucco Board (Items 48, 49)—Minneapolis and St. Paul, $55.00 to $60.00.

(Item 49)—Minneapolis and St. fir. **(Item 50)**—Minneapolis and St. Paul, Pine; Sioux City, Fir; Denver, No. 1 Com. Fir; **(Item 53)** Minneapolis and St. Paul, Fir. D. and M.; **(Item 54)**—Sioux City, E. G., Minneapolis and St. Paul, Fir; Des Moines, "B & B" Flat Flooring Y. P.; **(Item 56)**—Sioux City, D. Western Pine, Minneapolis and St. Paul, 2nd cl. Fir; **(Item 58)**—Sioux City, D. Western Pine; St. Louis, $125 to $170; **(Item 59)**—Sioux City, Fir; **(Item 60)**—Davenport, ⅝x4 in.; **(Item 62)**—Davenport, list; **(Item 67)**—Denver, White Pine, Minneapolis and St. Paul, 8 in., $96.00; 10-in.; $101.00; 12-in., $106 00; Kansas City, 8 in to 10 in. $46 00, 12 in., [illegible]

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. **WESTERN AND PACIFIC STATES** **CANADA**

All prices are retail, delivered-on-the-job, unless otherwise noted.
An asterisk (*) after a figure, refers to note below.
A star (★) after city name, denotes no revisions received.

Item	Unit	Butte, Mont.	Cheyenne, Wyo.	Los Angeles, Calif.	San Diego★	San Francisco	Portland, Ore.	Seattle, Wash.	Winnipeg★ Man.	Toronto, Ont.	Halifax,★ N. S.	Quebec
(1) Bulk Lime	per cwt.	.90	....	$1.10	$1.60	....	*	....	$0.60*	$0.825	$0.75	....
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	....	$3.50	3.00	2.70*	3.25	$3.50	$3.25	3.60	....	3.45*	3.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	5.75*	....
(4) Crushed Stone	per ton	....	....	....	2.12	....	....	....	....	2.445*	.15*	2.50
(5) Crushed Stone	per yd.	....	1.75*	....	....	....	....	....	4.35	2.1875*	3.30	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	21.00	18.00	....	20.00*	18.50	19.00	19.00	19.00	18.00	22.00	16.50*
(7) Corner Bead, galvanized	per ft.	....	.05	.07	.06	0385	.055	.06	.04	....	.055	.05
(8) Drain Tile, 4 in.	per ft.	....	....	....	.105	.05	.085	.072	.13	.08	....	.065
(9) Drain Tile, 6 in.	per ft.	....	....	.0975*	.14	.065	.09	.12*	.15	.11	....	.115
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	....	....	.3375	.50	.38	.45	.40	.55	.42	.35	....
(11) Flue Lining, 8½ in. x 13 in.	per ft.	....	....	.4875	.72	.55	.65	.60	.75	.60	.55	....
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	80.00	80.00	47.50	80.00	70.00	85.00	70.00	90.00	95.00	90.00	74.50
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	20.00	25.00	12.50	35.00*	20.00	22.00	24.00	40.00	22.00	22.00*	22.50
(14) Gravel, washed	per yd.	3.00	....	....	2.78	1.25	1.35*	....	3.50	1.35	3.75*	1.75
(15) Hollow Building Tile (8x12x12 in.)	per M.	15.00*	....	....	235.00	....	190.00	....	280.00	....	....	....
(16) Hollow Building Tile (8x5x12 in)	per M.	15.00*	....	100.00*	120.00	112.00	100.00	110.00	181.00*	....	....	....
(17) Hydrated Lime (masons) in 50 lb paper bags	per bag	1.25	.70*	1.00*	.85	1.10*	.75*	....	.63	.5563	.75	.72
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	....	....	.75	.90	....	.75*	24 00	.63	.5813	.80	....
(19) Hair	per bu.	.75	....	.60	.60*	....	....	....	1.00	....	....	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs ‡	per yd.	....	.45	.40	.44	.34	.45	.42	.36	....	.45	.34*
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	....	.42	....	....	.32	.36*	....	....	....	....	....
(22) Mortar Color, red	per lb.	.06	.07	.07	.05	.075	.12*	.08	.09	.0275	.10	.10
(23) Mortar Color, buff	per lb.	.07	.08	.07	.05	.075	.09*	.12	.09	....	.10	.10
(24) Mortar Color, double strength black	per lb.	.07	....	.07	.05	.10	.14*	....	.09	....	....	....
(25) Partition Tile, Clay (3x12x12 in.)	per. M.	....	....	85.00*	120.00	....	....	110.00	181.00	70.00	....	....
(26) Partition Tile, Clay (4x12x12 in.)	per. M	....	....	103.00*	140.00	....	....	120.00	203.00	85.00	.20*	....
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	....	....	....	....	....	....	.155	....	....	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	....	....	....	....	....	....	.165	....	....	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.70	4.60	3.41*	4.12	3.60	3.55	3.65	4.40	4.20	5.40	4.28
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.15	.12	.15	.15	.05	.20	.20	....	.20
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	55.00	....	65.00	48.00	....	....	....	....
(32) Plaster Board ⅜ in. thick	per M. sq. ft.	65.00	70.00*	....	50.00	....	38.00	.35*	56.50	36.25	37.50	46.00
(33) Sand (building)	per ton	....	....	....	1.63	....	45.00	....	....	1.40*	2.50	2.15
(34) Sand (building)	per yd.	2.50	2.00	....	....	....	1.35	....	3.50	3.50	3.75	....
(35) Sewer Pipe, single strength, off list	per cent.	....	....	....	*	....	....	....	.35*	40%	....	20%
(36) Wall Coping, 9 in.	per ft.	....	....	....	....	....	....	.20	.35	.36	....	....
(37) Wall Coping, 13 in.	per ft.	....	....	....	....	....	....	.28	.45	.54	....	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	22.00	....	....	....	....	....	25.50	18.50	....	29.25
(39) Wall Plaster, neat, in cloth, 100 lb. incl. sks	per ton	21.00	....	24.00*	26.00*	23.50*	22.50	24.00*	28.00*	22.50	....	....
(40) Wall Plaster, sanded, in cloth, 100 lb. incl. sks	per ton	....	....	....	....	....	....	....	....	14.00	....	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. incl. sks	per ton	21.00	....	....	....	....	....	26.00*	28.00*	12.50*	3.15*‡	....
(42) Wall Ties, galvanized	per M.	....	....	11.50	7.00	6.30	6.50	....	5.00*	....	7.00	4.00
(43) Wall Plugs	per M.	....	....	....	26.00	26.00	30.00	22.50	23.00	....	20.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	....	....	....	....	....	....	....	10.50	6.25*	....	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	....	....	3.50*‡	3.25†*	4.50*‡	3.25*	4.50**	5.10†*	3.25*	....	3.90†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	....	4.00§	3.75§*	3.75§*	3.50§*	3.60§*	3.20§*	4.00§*	3.95§*	5.15§*	3.75§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	....	....	....	48.00*	....	45.00	65.00	....	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	....	....	....	....	....	....	....	....	....
LUMBER ITEMS		*			†*		†*		†*			*
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	9.00*	12.00	12.50	13.00	10.00	5.50*	5.50	11.00	....	8.00	9.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	....	37.50*	....	40.00	....	20.00*	21.00*	45.00*	....	....	60.00*
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	50.00*	....	48.00	....	22.00	21.00*	48.00*	....	....	60.00*
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	46.00	....	12.00*	17.00*	42.00*	....	....	55.00*
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	40.00*	....	41.00	....	....	15.50	....	....	....	55.00*
(54) 1x4 "B" Flooring	per M. Board ft.	....	80.00*	....	78.00	....	35.00*	31.00*	84.00*	....	....	50.00*
(55) Yellow Pine Clear Finish	per M. Board ft.	....	100.00	....	96.00	....	55.00*	65.00*	....	....	....	100.00*
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	60.00	....	65.00	....	35.00*	34.00	....	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	....	....	....	80.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	....	....	....	....	....	....	....	....	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	95.00*	....	....	71.00	....	35.00*	36.00	56.00*	....	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	....	50.00	....	67.00	....	....	30.00	69.00*	....	....	45.00*
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	75.00	....	54.00	....	....	52.00*	....	....	....	....
(62) Mouldings, Yellow Pine	over list	....	50%	....	....	....	....	*	....	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	5.00	5.00	....	6.40*	....	3.50	3.75	....	....	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	6.00	....	....	....	....	....	7.50	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow Pine Boards	per M.	....	....	....	43.00	....	25.00*	21.00*	....	....	....	50.00*

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) means no cloth bags used.

(†) above San Diego lbr. prices means all items are Oregon Pine.

(†) above Winnipeg lbr. prices means 15 per cent off.

Lime (Item No. 1, bulk)—Per 70 lb. bu., Winnipeg; Portland, price on dock. **(Barreled, Items 2, 3)**, per 200 lb. bbl., San Diego, Halifax, 200 and 400 lbs. **Hydrated** (Items 17, 18)—Ton rate, Portland; Portland, 15c credit for returned sacks (20, 21) (also 10c). Los Angeles, Tiger Brand, fine; San Francisco, per 80 lbs.; Cheyenne, 40 lb. paper bags.

Crushed Stone (Items 4, 5)—Toronto, car lot prices. (Item 4), under 2 in. (Item 5), 2 in. and

rate, San Diego; Quebec, another quotes $16.00.

Drain Tile (Item 8, 9)—Seattle, clay; Los Angeles, f.o.b. factory, cartage extra.

Fire Clay (Item 13)—San Diego, returned sacks, 8c; 15c, **Halifax.**

Gravel (Item 14)—Portland, price on dock; Halifax, cu. yd.

Hollow Building Tile (Item 15, 16)—Los Angeles, 5½x8x11½ (Heath); Butte, per ton at yard; Winnipeg, another quotes $155.00.

Hair (19)—Rope fibre used in San Diego, per pkg.

Metal Lath (Item 21)—Portland, Gauge No. 27. Quebec, galvanized.

Mortar Color (Items 22, 23, 24)—Portland, iron oxide.

Partition Tile, Clay (Item 25, 26)—Per sq. ft., Halifax; Los Angeles, f.o.b. factory, cartage extra.

Plaster Board (Item 32)—Cheyenne, sheetrock; Seattle, per yd.

Sand (Item 33)—Toronto, car lots on track.

Sewer Pipe (Item 35)—San Diego, sells at list; Winnipeg, price for 4 in.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c, San Francisco, Winnipeg, sacks, 20c, Halifax; sacks, 12c, Los Angeles, San Diego; (Item 41), per bbl., Toronto, Seattle, including sks., 10c each.

Wall Ties (Item 42)—Winnipeg, corrugated.

Roofing Slate Surf. (Item 45)—Los Angeles, 80 lbs.; Seattle, San Francisco, 95 lbs.; San Diego, 55 lbs.; 80 lbs., Winnipeg.

Roofing Smooth Surf. (Item 46)—Toronto, Everlastic; Seattle,

80 lbs., Halifax; Portland, best grade.

Stucco Board (Item 47)—San Francisco, button lath, ⅜ in. thick.

(Item 49)—Portland, fir; Quebec, spruce; Butte, pine. **(Items 50, 51, 52)**—Quebec, spruce; Cheyenne (50) fir; (51) white pine; Winnipeg, Seattle, fir; (52) Portland, No. 3 Shiplap; **(Item 53)**—Quebec, spruce; Cheyenne, White Pine. **(Item 54)**—Winnipeg, Eg. fir, less 20 per cent.; Portland, fir; Seattle, S. G. Fir; Quebec, spruce; Cheyenne $60.00 & $80.00 fir. **(Item 55)**—Seattle, Portland, fir; Quebec, spruce. **(Item 56)**—Portland, fir; **(Items 59, 60)**—Winnipeg, less 15 per cent.; Portland, fir; Quebec, spruce; Butte, C. Pine. **(Item 61)**—Seattle, cedar; **(Item 62)**—Seattle, list; **(Item 63)** San Diego,

Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum,* 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

ASBESTOS PRODUCTS

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
Ambler Asbestos Shingles. Catalog. 5½ x 8½ in. 40 pp. Illustrated.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 36 pp. Illustrated. Standard Purlin Spacing Tables.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.
Engineers' Data Sheets. Catalog. 8½ x 11 in. 40 pp. Illustrated. Specifications and working sheets for Ambler Asbestos Corrugated Roofing and Siding.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Johns-Manville Asbestos Wood. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data. List of uses for asbestos wood.

BALANCES, SASH

Caldwell Mfg. Company, The, Rochester, N. Y.
Suggestion for the present-day Architect. Booklet. 6 x 9 in. 16 pp. Illustrated. Gives full-size dimensions and information for the purpose of writing specifications for Caldwell Sash Balances.

BOILERS—See Heating Equipment

BRICK

American Face Brick Association, 1151 Westminster Bldg., Chicago, Ill.
The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.
The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect. Price 50c.
A Manual of Face-Brick Construction. Booklet. 8½ x 11 in. Textbook on construction of the brick wall and various uses of face brick. 31 colored plates of brick houses with plans. Price, $1.00.

Common Brick Manufacturers Association of America, 1309 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available. Price $1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 48 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

BUILDING STONE—See Stone, Building

CEMENT

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.
Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Pyrobar Gypsum Tile. Booklet. 8½ x 11 in. 32 pp. Illustrated. Details and specifications for fireproof partitions.
Bulletins, 8½ x 11 in., containing details and specifications for Pyrobar voids for use with reinforced concrete joist floor construction; Pyrobar roof tile; and monolithic gypsum floors and roofs.

DECORATIVE FABRICS

M. H. Rogers, Inc., 912 Broadway, New York, N. Y.
Samples of the following materials will be sent to architects upon request, to meet specific requirements:
Tapestries, velours, damasks, armures, cretonnes, tapestry panels, needlepoints, chair and sofa seats and backs.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.
Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.
Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

Truscon Steel Company, Youngstown, Ohio
Truscon Steel Windows. Catalog. 8½ x 11 in. 80 pp. Illustrated. Describing steel windows for industrial and commercial buildings.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Frink, I. P., Inc., 24th Street and 10th Avenue, New York, N. Y.
Catalog 415. 8½ x 11 in. 46 pp. Photographs and scaled cross sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

Kohler Co., Kohler, Wis.
Kohler Automatic Power and Light 110 Volt D. C. Booklet. 5 x 7 in. 32 pp. Illustrated. Describes a standard voltage automatic, electric power and light plant for isolated homes.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.
Simplex Manual Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Smyser-Royer Co., 1609 Sansom St., Philadelphia, Pa.
Exterior Lighting Fixtures. Catalog F. 8½ x 11½ in. Illustrated. Illustrates lamp standards, brackets, lanterns and pier lights, for exterior use.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 264. 8¼ x 10⅞ in. 54 pp. Illustrated. Gives description with diagrams of various types of motors, generators, generating sets, propeller fans, air heaters, and apparatus for special application.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.
Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.
Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.
Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.
Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 130 West 34th St., New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs and brief descriptions.

Anchor Post Iron Works, 165 Broadway, New York, N. Y.
Catalog 51. 8½ x 11 in. 53 pp. Illustrated. Anchor Post Fences for Country Place, Factory or Farm.
Catalog 54. 8½ x 11 in. 24 pp. Illustrated. Factory Fences.

FIRE DOORS—See Doors, Windows and Trim, Metal

FIREPLACE EQUIPMENT

Covert Co., H. W., 137 E. 46th Street, New York, N. Y.
Hints on Fireplace Construction. Catalog. 5½ x 8½ in. 11 pp. Illustrated.
Diagrams of construction and installation of Covert "Improved" and "Old Style" Dampers and Smoke Chambers.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 68*

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
Armstrong's Cork Tile. Booklet. 5 x 7 in. 16 pp. Illustrated in color.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
Speaking of Floors. Booklet. 11¼ x 15 in. 16 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1921. Catalog. 3½ x 6 in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book. Three books. 3½ x 5¾ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.

Carter Bloxonend Flooring Co., 1303 R. A. Long Bldg., Kansas City, Mo.
Blox-on-end Flooring. Catalog. 3¼ x 6¼ in. 20 pp. Illustrated. Describing Blox-on-end Flooring and its adaptability to concrete, wood or steel construction; also various methods of installation.
Specification Sheet. 8½ x 11 in. 4 pp. Illustrated. Standard specifications in convenient form for architects and engineers as recommended by the American Institute of Architects.

Congoleum Company, Inc. (Linoleum Dept.), Philadelphia, Pa.
Specifications for Laying Linoleum and Cork Carpet, illustrating a new and better method of laying these materials.
Linoleum Service Sheet. Gives complete printed specifications as well as detail drawings showing application in specific cases such as thresholds, staircases, under radiators, etc.
Installation and Care of Battleship Linoleum. Booklet. 6 x 9 in. 16 pp. Illustrated. Instructions as to the uses of Battleship Linoleum, its laying and care.
Quality Sample Book. Showing a sample of plain brown linoleum and of every grade of Battleship Linoleum, Inlaid Linoleum and Cork Carpet.

Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.
Modern Oak Floors. Booklet. 6¼ x 9¼ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
Oak Flooring, How and When to Use it. Booklet. 3½ x 6¼ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thickness and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

General Chemical Company, The, 25 Broad Street, New York, N. Y.
Hard-N-Tyte for concrete and mortars. Booklet. 3½ x 8½ in. 8 pp. Illustrated. Describes use of Hard-N-Tyte as application for hardening concrete floors.
The Hard-n-tyte Specification. Booklet. 8½ x 11 in. 4 pp. Gives exact specifications for concrete floor finish.

Sonneborn Sons, Inc., L., 266 Pearl Street, New York.
Concrete and Lapidolith. Booklet. 5⅜ x 8⅛ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolise? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

FURNACES—See Heating Equipment

FURNITURE

Estey Organ Company, Brattleboro, Vt.
Pipe Organs. Complete specifications and full information furnished to the architect for pipe organ to be installed in any given residence, upon receipt of plans and other particulars.

GLASS CONSTRUCTION

King Construction Company, N. Tonawanda, N. Y.
Catalog No. 52. 9 x 11 in. 45 pp. Illustrated. Illustrating and describing greenhouses erected for private estates and public parks.

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3⅞ x 8½ in. 32 pp. Illustrated Covers the complete line.

GRANITE—See Stone, Building

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
Ball Bearing Butts. Booklet. B8. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 12F 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American District Steam Company, North Tonawanda, N. Y.
Bulletin No. 150-AF. 6 x 9 in. 32 pp. Illustrated. Describes the Adsco System of Atmospheric Steam Heating and explains how it saves 20 to 30% of fuel cost. Tells how to figure radiation.
Catalog No. 21-AF. 6 x 9 in. 200 pp. Illustrated. Lists and describes the full line of equipment and devices manufactured for use on underground and interior steam mains, expansion joints, steam meters, condensation meters, traps, flange fittings, angle fittings, manhole curbs, alignment guides, etc.

American Radiator Co., 816 South Michigan Avenue, Chicago, Ill.
Engineers' Data Book. 8 x 10¾ in. 48 pp. Illustrated. Valuable engineering data for estimating heating and ventilating requirements.
Ventilation for Vento Heaters. Catalog. 8 x 10¾ in. 24 pp. Illustrated. Examples of installation.

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam. Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Excelso Specialty Works, 119 Clinton St., Buffalo, N. Y.
Excelso Water Heater. Booklet. 12 pp. 3 x 6 in. Illustrated. Describing the new Excelso method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)

Kelsey Heating Company, James St., Syracuse, N. Y.
Booklet No. 5. 4 x 9 in. 32 pp. Illustrated. A dealers' booklet showing the Kelsey Warm Air Generator Method of warming and distributing air. Gives dimensions, heating capacities, weights, kind of coal recommended, and shows the mechanical and gravity system of heating homes, churches and schools.
Monroe Pipeless Booklet. 4½ x 8 in. 20 pp. Illustrated.
Monroe Tubular Heater. Booklet. 4½ x 8 in. 20 pp. Illustrated. General Booklet giving capacities, dimensions, weights, etc.
Syracuse Pipeless Booklet. 4½ x 8 in. 12 pp. Illustrated. General Booklet, giving sizes and capacities.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.

Minneapolis Heat Regulator Company, Minneapolis, Minn.
The Heart of the Heating Plant. Catalog. 6 x 9 in. 20 pp. Illustrated. Describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used.

Page Boiler Company, The Wm. H., 141 West 36th Street, New York, N. Y.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions with specifications of the Volunteer Round and Monarch Square Sectional Boilers; also the Monarch Up-Draft and Down-Draft Smokeless Boiler; with method for apportioning size of boiler and radiation, and other heating data.

Smith Co., H. B., 57 Main Street, Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 230. 8¼ x 10⅞ in. 132 pp. Illustrated. Gives description and data tables of various types of heaters, also of steam traps.
Bulletin No. 227. 8⅜ x 10 11/16 in. 28 pp. Blue prints of heating and ventilating layouts in public buildings, factories, etc.
Catalog No. 1015. Book on Heating and Ventilating, complete with installations and diagrams.

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¼ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
Capitol Smokeless Type Boilers. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describing a new type of low-pressure heating boiler which burns soft coal without smoke.

Warren Webster & Co., Camden, N. J.
Webster Vacuum System of Steam Heating. Catalog. 8 x 10½ in. 36 pp. Illustrated. Describing the Webster Vacuum System of Steam Heating, its principles of operation, and advantages of installation.
Webster Feed-Water Heaters. Catalog. 8 x 10½ in. 28 pp. Illustrated. Describing the construction and operation of the Webster Feed-Water Heaters for steam-heating systems, power plants and industrial plants of every type.

HEAT REGULATORS—See Heating Equipment

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

INSULATION

Bishopric Mfg. Company, 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Business Noise, Its Cost and Prevention. Booklet. 6 x 9¼ in. 16 pp. Illustrated. Data on correction of acoustics in offices, theaters, churches, etc.

Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 69*

JOISTS AND STUDS, PRESSED STEEL

Truscon Steel Company, Youngstown, Ohio
Truscon Structural Pressed Steel. Catalog. 8½ x 11 in. 24 pp. Illustrated. Information on Pressed Steel Beams and Joists for light occupancy buildings. Tables, specifications and views of installations.

LATH, METAL AND REINFORCING

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

Truscon Steel Co., Youngstown, Ohio.
Hy-Rib and Metal Lath. 18th ed. Catalog. 8½ x 11 in. 64 pp. Illustrated. Gives properties of laths, specifications special uses and views of installations.

LUMBER

California Redwood Assn., 206 Marvin Bldg., San Francisco, Calif.
California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated. Describes the use of Redwood Lumber for various places and conditions in the building of the home.

Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.
The Post Everlasting. Booklet. 10½ x 7½ in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.
Poles That Resist Decay. Booklet. 9¼ x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.

Morgan Millwork Organization, Chicago, Ill.
Building With Assurance. Book. 8½ x 11 in. 408 pp. Illustrated: Valuable to architects for the Standardized Mill Work illustrated and described.
Price Supplement. Catalog. 4 x 8 in. 96 pp. Illustrated. Prices all illustrations in "Building With Assurance" and is valuable in connection with it or by itself.

Pacific Lumber Company of Illinois, The, 1105 Lumber Exchange Bldg., Chicago.
Engineering Digest. Redwood Information Sheets. 1. General Data Sheet on Redwood, its Production and Uses. 2. Tanks and Vats for Water, Acid and Alkali Solutions and Oil. 3. Pipe for Water, Chemicals and Sewage Conveying. 6. Farm and Dairy Buildings and Equipment, Silos, Tanks, Pipe, Outbuildings, Irrigation Flumes, Drainage Boxes, Greenhouses, Etc. 9. Railroad Construction and Equipment. 10. Industrial Building Materials. 11. Residential Building Materials.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Brass Company, Waterbury, Conn.
Illustrated pamphlet describes the use and adaptability of extruded architectural shapes to meet the architect's design.

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.

Rome Brass & Copper Company, Rome, N. Y.
Descriptive Price List. 5 x 7 in. A leather-covered loose-leaf book listing sheets, tubes, rods, rolls, anodes, strips, extruded shapes, angles and channels, tapered tubes and hose pipes; molding, door-rail; commutator bars and segments; electrical copper bar, rivets and burs.

METAL TRIM—See Doors, Windows and Trim, Metal

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6⅜ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

OFFICE SUPPLIES

Dixon Crucible Co., Joseph, Pencil Dept., 224 J. Jersey City, N. J.
Finding Your Pencil. Booklet. 6¼ x 3¾ in. 16 pp. Illustrated.
The First Five. Booklet. 3½ x 5¼ in. 10 pp. Illustrated.
A Study in Sepia. Booklet. 7 x 4½ in. 5 pp. Illustrated.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Berry Brothers, Detroit, Michigan.
"Natural Woods and How to Finish Them." Booklet. 6½ x 4¾ in. 95 pp. Containing technical information and advice concerning wood finishing.
"Beautiful Homes." Booklet. 8½ x 6½ in. 26 pp. Illustrated in colors. Giving information to home builders and others on interior finishing.

PAINTS, STAINS, VARNISHES and WOOD FINISHES — Continued

Boston Varnish Co., Everett Station, Boston, Mass.
The Inviting Home. Booklet. 5½ x 9 in. 16 pp. Color Plates. A briefly worded book on painting for the busy architect or decorator.

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

Fox Co., M. Ewing, New York, N. Y.
Calcimines. Booklet. 3¼ x 6¼ in. 8 pp. Color cards.

S. C. Johnson & Son, Racine, Wis.
The Proper Treatment for Floors, Woodwork & Furniture. Booklet. 6¼ x 8⅝ in. 32 pp. Illustrated in color. A treatise on finishing hard and soft wood in stained and enameled effects; also natural wood effects.
Portfolio of Wood Panels. 5½ x 10¾ in. 14 pp. A portfolio containing actual panels of finished woods. Also contains valuable information on finishing and re-finishing floors and woodwork.

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book. 5½ x 3¼ in. 100 pp. Gives directions and formulas for painting various surfaces of wood, plaster, metal, etc., both interior and exterior.
Red Lead in Paste Form. Booklet. 6¼ x 3½ in. 16 pp. Illustrated. Directions and formulas for painting metals.
Came Lead. Booklet. 8¾ x 6 in. 12 pp. Illustrated. Describes various styles of lead cames.
Cinch Anchoring Specialties. Booklet. 6 x 3½ in. 20 pp. Illustrated. Describes complete line of expansion bolts.

O'Brien Varnish Co., 1121 Washington Avenue, South Bend, Ind.
That Magic Thing Called Color. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.
Architects' Specification Manual. 8½ x 11 in. 50 pp. Complete specifications for all paint products.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Preservative Coatings. Booklet. 6 x 9 in. 15 pp. Illustrated. Presents in a concise manner the properties and uses of the Standard Paint Company's various paint preparations.

The Sherwin-Williams Co., 882 Canal Road, Cleveland, Ohio.
A Book of Painting and Varnishing Specifications. 8½ x 11 in. 30 pp. A text book on painting and finishing.
Announcement of Sherwin-Williams Flat-Tone Multi-Color Effects. Booklet. 2½ x 6 in. 10 pp. Illustrated. Development of a new system of wall decoration.
Industrial Efficiency and Egg Shell Mill White. Booklet. 6¾ x 10 in.

Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.

Wadsworth-Howland Co., Inc., Boston, Mass.
Paints and Varnishes. Catalog. 5¾ x 8½ in. 140 pp. Illustrated. Covers the complete line.

PARTITIONS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Folding Partitions. Booklet. 8½ x 11½ in. 16 pp. Illustrated. Covers the field of folding partitions for churches, schools, hotels, clubs and public institutions.
Rolling Partitions, Hygienic and Disappearing Door Wardrobes. Booklet. 6 x 9 in. 32 pp. Illustrated. Describes rolling partitions, particularly in churches and schools, and wardrobes as installed in schools and public institutions.

PIPE

American Brass Company, Waterbury, Conn.
Illustrated pamphlet giving tables of weights and price-lists devoted to Brass and Copper Pipe in iron pipe and plumbers' sizes.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.

PLUMBING EQUIPMENT

American Brass Company, Waterbury, Conn.
Benedict Nickel. Illustrated pamphlet descriptive of Benedict Nickel White Metal for high-grade plumbing fixtures.

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.

Kohler Co., Kohler, Wis.
Kohler of Kohler. 5½ x 8 in. 48 pp. Illustrated catalog. Shows complete line of plumbing fixtures.
Kohler Architect Specification Forms. 8½ x 11 in. Loose leaf portfolios intended to cover individual specifications. Separate illustrations and specification sheets provided.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 70*

PLUMBING EQUIPMENT — Continued

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Speakman Company, Wilmington, Del.
Speakman Showers and Fixtures. Catalog. 4½ x 7½ in. 250 pp. Illustrated. Catalog of Modern Showers and Brass Plumbing Fixtures, with drawings showing layouts, measurements, etc.
Toned Up In Ten Minutes. Booklet. 7½ x 10½ in. 16 pp. Illustrated. Modern Showers and Washups for Industrial Plants, showing the sanitary method of washing in running water.

Wolff Manufacturing Company, 255 No. Hoyne Ave., Chicago, Ill.
Plumbing Suggestions. Catalog. 3¼ x 6 in. 50 pp. Illustrated. Illustrating, describing and pricing Wolff Quality Plumbing Fixtures for residential installation.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10⅝ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

ROLLING DOORS AND SHUTTERS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Rolling Doors and Shutters—Steel and Wood. Catalog. 8½ x 11½ in. 80 pp. Illustrated. For engineers and architects. Covers all classes of heavy doors, for every purpose, and in great variety of materials, bronze, steel and wood. Many sheets of detail drawings.

ROOFING

American Brass Company, Waterbury, Conn.
Copper Products for Roofing Purposes. Illustrated price-list devoted to copper products, including sheets and rolls, for fabricating into leaders, gutters, flashings, shingles, etc.

Creo-Dipt Company, 1025 Oliver St., North Tonawanda, N. Y.
Architectural Service Sheets. 8½ x 11 in. Illustrated. Working drawings of construction, with standard specifications for design and construction of same.

Philip Carey Co., The, Cincinnati, Ohio.
Architects Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Illinois Zinc Company, 280 Broadway, New York, N. Y.
Pure Rolled Zinc. (Corrugated and Plain Sheets.) Booklet. 3½ x 6¼ in. 8 pp. Illustrated. Facts regarding adaptability of zinc for roofing. Specifications of corrugated zinc sheets. Weights per square. Comparative gauge lists.
The Roof That's Always New. Booklet. 3⅜ x 6 in. 12 pp. Illustrated. Story of Illinois Zinc Shingles, their everlasting and artistic qualities. Information regarding a complete zinc roof, shingles, starting piece, valley, ridge and hip piece.

Johns-Manville, Inc., Madison Avenue and 41st Street, New York.
Johns-Manville Colorblende Asbestos Shingles. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. 3½ x 6 in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Instructions for Laying Built-up Roofs. Booklet. 8½ x 11 in. Illustrated.
Roofing Facts Worth Knowing. Booklet. 6 x 9 in. 16 pp. Illustrated.

N. & G. Taylor Company, 300 Chestnut Street, Philadelphia, Pa.
Selling Arguments for Tin Roofing. Booklet. 6¼ x 9¼ in. 80 pp. Illustrated. Describes the various advantages of the use of high grade roofing tin, gives standard specifications, general instructions for the use of roofing tin, illustrates in detail methods of application.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHEATHING

Bishopric Mfg. Company, 103 Este Ave., Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

STANDARD BUILDINGS

Truscon Steel Co., Youngstown, Ohio.
Truscon Standard Buildings, 4th ed. Catalog. 8½ x 11 in. 40 pp. Illustrated. Erection details, cross-section diagrams and adaptations are given.

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Vol. 1. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 4. Indiana Limestone Bank Book. 6 x 9 in. 48 pp. Illustrated. Descriptive of the use of Indiana Limestone for bank buildings, with partial list of buildings in which it has been used.
Vol. 27. Designs for Houses of Indiana Limestone. 8½ x 11 in. 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review.*

STORE FRONTS

Kawneer Co., The, Niles, Mich.
Kawneer Solid Copper Store Fronts. Catalog. "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
A Collection of Successful Designs. Catalog. 9¼ x 6½ in. 64 pp. Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

Zouri Drawn Metals Co., B. J. 10, Chicago Heights, Ill.
Architects' Catalog. 8¾ x 11¾ in. 86 pp. Illustrated. Showing a true copy of the approval of the Underwriters' Laboratories. Showing a proper glazing specification, based on the Underwriters' Report.
Catalog B. J. 8. 6 x 9 in. 68 pp. Illustrated. Key to Getting the People In.

STUCCO BASES

Bishopric Manufacturing Co., 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco board and Bishopric sheathing board.

STUCCO, MAGNESITE

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

TERRA COTTA

Atlantic Terra Cotta Co., 1170 Broadway, New York, N. Y.
Questions Answered. Booklet, 7½ x 5¼ in. 32 pp. Illustrated.
A synopsis of questions most frequently asked by architects in relation to terra cotta, with brief but complete answers; contains many illustrations.

National Terra Cotta Society, 1 Madison Avenue, New York, N. Y.
Standard Construction, Indexed, bound volume. 10½ x 16 in. 90 pp. 70 Illustrations. Standard forms of terra cotta construction with short article.
"The School." 10½ x 13½ in. 34 pp. 92 Illustrations. Types of school buildings with short descriptive articles. Volume I, brochure series.
"The Theatre." 10½ x 13½ in. 36 pp. 102 Illustrations. Types of theatre buildings with short descriptive articles. Volume II, brochure series.
"The Store." 10½ x 13½ in. 34 pp. 60 Illustrations. Types of store buildings with short descriptive articles. Volume III, brochure series.

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

THERMOSTATS—See Heating Equipment

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

Norton Company, Worcester, Mass.
Alundum Safety Tile. Booklet. 5 x 8 in. 15 pp. Illustrated. Description of material and its installation.
Tests of Alundum Tile. Booklet. 5 x 8 in. 18 pp. Illustrated. Describes its composition and proves its adaptability for its innumerable purposes.

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 71*

TILE, HOLLOW — Continued

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172. 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.
Fireproof Buildings of Natco Hollow Tile. Booklet 8½ x 11 in. 16 pp. Illustrated. Showing the use of Natco Hollow Tile for private residences.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.
Gorton & Lidgerwood Company, 96 Liberty St., New York, N. Y.
Gorton Quarter-Turn Packing-Lock Valves. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Describing a new type of valve for all systems of steam, hot water and vacuum heating.
Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates.
Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ in. 16 pp. Illustrated.
Warren Webster & Co., Camden, N. J.
The Webster Type N Modulation Valves. Catalog. 8 x 10½ in. 8 pp. Illustrated. Describing a quick response, conveniently operated, and simple radiator supply valve.
The Webster Sylphon Trap. Booklet. 8 x 10½ in. 12 pp. Illustrated. Explaining the importance of the properly operating radiator return trap.

VENETIAN BLINDS AND AWNINGS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Diffuselite System of Lighting. A number of leaflets and folders covering Diffuselite Paints, Blinds and Fixtures.

VENTILATION

Globe Ventilator Co., Dept. P., Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.

WALL BOARDS

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.
United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Walls of Worth. Booklet. 8½ x 11 in. 24 pp. Illustrated. Describes Sheetrock, the fireproof wall board, its advantages and uses

WATERPROOFING

Ruberoid Co., The, 95 Madison Ave., N. Y.
Impervite. Circular. 8½ x 11 in. 4 pp. Illustrated. An integral waterproofing compound for concrete, stucco, cement, mortar, etc.

WATER SOFTENERS

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WINDOW HARDWARE

Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¼ in. 24 pp. Illustrated. Covers complete line.
Smith & Egge Mfg. Co., The. Bridgeport, Conn.
Booklet. 6¾ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

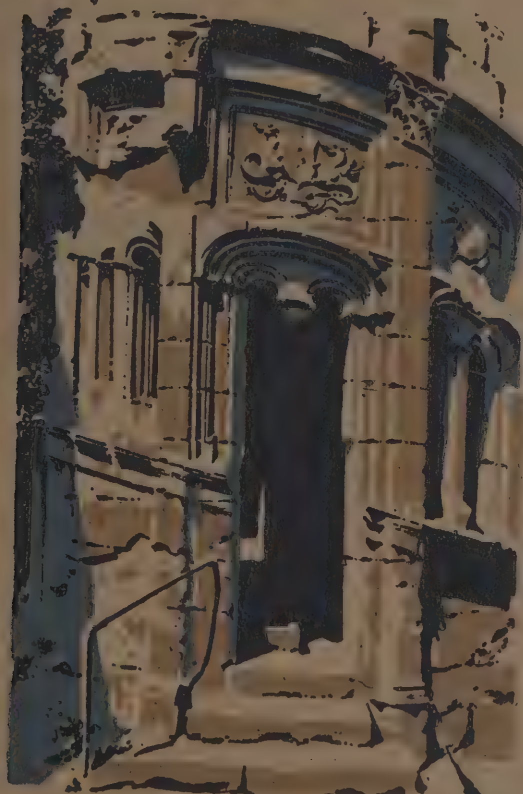
WINDOWS, CASEMENT

Crittall Casement Window Co., 2703 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.
Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Architects' Portfolio. 8½ x 11 in. Loose-leaf. Large scale working details for mill-work and installation.
F. S. Details 20 x 23 in. and 15 x 22 in. Working details for mill-work and installation.
Hoffman Casements Catalogue. 7 x 8½ in. 16 pp. Illustrated.
Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

WOOD — See Lumber

F. Q.

THE ARCHITECTURAL FORUM



OCTOBER 1921

ingle Copy Sixty Cents ROGERS AND MANSON CO., PUBLISHERS Six Dollars the Year

THE ARCHITECTURAL FORUM

VOLUME XXXV NUMBER 4

CONTENTS for OCTOBER 1921

PLATE ILLUSTRATIONS

LETTERPRESS

ALBERT J. MacDONALD, Editor

Published Monthly by
ROGERS AND MANSON COMPANY
142 Berkeley Street, Boston 17, Mass.
Advertising Department, 103 Park Avenue, New York
Yearly Subscription, payable in advance, U.S.A., Insular Possessions and Cuba, $6.00
Canada $6.75 Foreign Countries in the Postal Union, 7.50
Single Copies 60 cents All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.

Albert J. MacDonald, Pres. and Treas., S. Howard Myers, Vice-pres., Robert Sweet, Sec.

THE EDITOR'S FORUM

City Zoning Regulations

ONE of the most interesting meetings at the last American Institute of Architects' convention was that addressed by Harvey W. Corbett of New York on the subject of zoning, particularly as it related to New York. There seemed to be a real interest on the part of architects from various sections of the country to learn more of the principles of zoning.

New York was the first city to adopt general zoning regulations and in the five years since their enactment a sufficient number of buildings have been erected to make possible a fairly adequate survey of the results. In this issue we illustrate, therefore, some of the principal buildings erected under the restrictions and publish articles that are intended to point out improvements that should develop as architects become more familiar with their requirements and evolve means of meeting them. Mr. Swan, who has been intimately associated with the application of the law, suggests a number of changes that actual working conditions seem to make desirable. His observations should be valuable to other cities contemplating the adoption of zoning. Mr. Pond and Mr. Embury approach the problem from an architectural viewpoint, and their papers complete a presentation that we hope will be both interesting in depicting the results of the most important influence that has affected architecture in recent years, and helpful to those desiring familiarity with technical and legal aspects of the problem.

From both architectural and public welfare viewpoints, zoning and the regulation of building heights are now very generally recognized as most beneficial. The control of high building design has been the one thing needed to bring our city architecture out of the commonplace and enable some sense of individuality to be incorporated in our buildings. Greater opportunity is afforded the creative designer than ever before and his work will be more evident to the general public than previously, because the contrast between good and bad design will be more marked. Merely arranging a structure which will be a literal interpretation of the law and providing the maximum cubage in the form the law permits, will never produce a good building; it requires the inventive genius of the capable architect to study the problem to obtain pleasing masses and at the same time the maximum amount of usable space for the owners. In our larger cities we are now able to design buildings with three dimensions instead of the mere street fronts which passed for many years as an excuse for architecture. It is an interesting fact that the new provisions have not of themselves increased the cost of building in New York. In general it may be said that as great an amount of rentable area can be provided in a building with setbacks as in the former box type, with no appreciable difference in cost.

Zoning and the regulation of building heights have unquestionably come to stay; their advantages are now recognized by even their early opponents. The advantages of zoning do not apply only to the large city; they are just as important in the smaller community because the principal evil zoning corrects is the shifting and shrinkage of real estate values that always occur in unrestricted localities. Every community, large or small, should interest itself in zoning and strive to secure its adoption which, with an adequate city plan for future development, will make the municipal progress of the next generation a far more satisfactory affair than in past years and obviate the necessity of grappling with bad conditions after they are created and difficult of improvement because of the great cost involved.

BOOK NOTES

A COLLECTION OF ANTIQUE VASES, TRIPODS, CANDELABRA, ETC. From Various Museums and Collections, after Engravings by Henry Moses and others. 60 plates ($5\frac{3}{4}$ x 8 ins.). Price 10s. 6d. John Tiranti & Co., London.

OF all the remains of the antique age none have excited more universal interest than vases in their different forms, and closely allied to vases are the candelabra, pedestals and other objects, a study of which has formed the basis of every form of architectural style.

In this volume there are gathered 60 plates, chiefly after Piranesi, which are well calculated to fire the imagination of the laity and to broaden and deepen the knowledge and to train the taste of the student, whether he be architect or decorator. It is difficult for us to realize how closely Roman life was bound up with architecture and building; wherever Rome planted her standard, from the Persian Gulf to the British Isles, she left an indelible impress which was always given an architectural form, and as each generation of architects studies anew the origin and development of design, there becomes stronger the dependence of the modern world upon antiquity's treasures, many of which are reproduced in these plates.

The excellent illustrations and the memoranda in which are given the names of the museums or collections in which are such pieces as still exist, add to its helpfulness.

The Partition That Took Twelve Years to Build

Years ago in my tiny cabinet shop in Pearl Street, the idea was born.

Why not a partition erected with screws, instead of nails, so you could use it and re-use it, in one place or another, and still use it again?

A partition that could be raised and lowered—stretched or contracted—in short, one that would fit wherever you wanted it to.

That was the idea and that is what it has taken me twelve years to accomplish. Slowly I have advanced but surely; for architects have suggested—owners and building managers have recommended and builders advised while I have changed and corrected and changed again until now Telesco Partition is the choice of 350 owners and building managers and architects who have used it.

There then is the story of how I worked out my idea of building a ***perfect*** office partition.

Here is what the Vinton Co. of Detroit, one time makers of partitions themselves, say of the accomplishment.

President

The flexibility of Telesco Partition is demonstrated in this office. Only standard units are used, with telescoping bars extended under high ceilings

Gentlemen:

"We have used your Telesco Partition exclusively in the Vinton Building, and are thoroughly satisfied with it, in every way. It is economical to erect, and its elasticity permits such a variety of arrangement in offices that we believe it to be the most desirable partition on the market.

We also find the expense in alterations reduced to a minimum.

Your promptness in deliveries is also to be commended."

VINTON COMPANY

Robert McFate, Treas.

1-C

Our catalog shows the complete construction

IMPROVED OFFICE PARTITION COMPANY

25 GRAND ST. ELMHURST, NEW YORK, N.Y.

ASSOCIATION BUILDING, VIEWED ACROSS LIBRARY TERRACE, NEW YORK
STARRETT & VAN VLECK, ARCHITECTS

The
ARCHITECTURAL FORUM

VOLUME XXXV | OCTOBER 1921 | NUMBER 4

New York's New Architecture

THE EFFECT OF THE ZONING LAW ON HIGH BUILDINGS

By AYMAR EMBURY II

"THE law was framed to stabilize and conserve property values, to relieve the rapidly increasing congestion in the streets and on the transit lines, to provide greater safety in buildings and in the streets, and in general to make the business of the city more efficient and the life of the city more healthful and agreeable."

Thus writes George B. Ford, the Consultant of the Commission which framed the law. Nero doubtless wrote to much the same effect, after he had burned down some of Rome, for he found that the narrow streets of the old city were so jammed with the tenants of the six- or seven-story tenement houses that a considerable portion of the population of Rome was burned up; since many of these people were useful to him and since it was practically impossible for him to enjoy the spectacle of their death, he made and published a law which was not at all dissimilar from our "modern and novel" idea, prohibiting the construction of buildings of over stipulated heights in streets of given widths, and assigning definite areas to certain trades.

I have not happened to find what the people of Rome thought about their zoning law, and I do not suppose that what they thought mattered very much; but, amazing though it may seem, our law seems to be in a fair way to accomplishing its purposes, while the fears openly expressed by the Commission, that the law would work real hardship on some owners of real property, have fortunately been negligible—nor has the law interfered greatly with people who desired to alter or rebuild existing structures, mainly because the "use" districts were made as nearly as possible co-extensive with the sections of the city which had grown naturally into specialized districts of one sort or another. So this law, which was received very doubtfully, and considered as a radical experiment, has shown itself to be conservative in its action, and has awakened practically no active opposition. To the benefits anticipated by the framers of the law have been added others of considerable interest and importance to the architectural profession, which were certainly not obvious on the face of things. One cannot help suspecting that the architects on the committee must have perceived at least their possibility, although as these were æsthetic rather than practical, one can imagine that they were not particularly urged as reasons for the passage of the law since any purely æsthetic reason is received with suspicion and doubtfully regarded as a detriment by our sound business men. The first, and thus far the most obvious, result has been to increase greatly the possibilities of interesting treatment in the upper stories of high buildings; the second, which is as yet a tendency rather than an accomplishment, is to produce a certain unity in our street facades through the limitation of heights, and it is of these two factors that I wish chiefly to write.

The aspect of any city depends upon several unrelated factors, each of which may redeem what would otherwise be a very ugly place. Paris, for example, is generally cited as being a beautiful city, and in speaking of it, architects are apt to attribute its pleasing appearance to the uniformity of the cornice heights throughout the city and to the similarity in the design of the greater part of its buildings. My own opinion is that its beauty is largely due to the great number of trees which diversify its streets, and that Paris without the trees would be a dull, monotonous city, not so stupid as New York in the brownstone period, but not so much better, either. On the other hand, in New York we have to get along without any trees at all, so that our irregular street facades, with buildings of all conceivable sizes, utterly unlike in use, material, color, scale and precedent, are revealed in their raw disregard of one another's rights to artistic consideration. Trees would help the appearance of New York more than any zoning law, for these unfortunate discrepancies would be masked to some extent, but if our city is to be beautiful, we will have to depend on the buildings themselves.

Now the appearance of any city, or of any street

of a city, is dependent upon the appearance of the average of all the buildings which face it; an ugly street cannot be made beautiful by one or two beautiful buildings, nor destroyed by one or two architecturally ugly structures, although the influence on a neutral street of one or two examples of extreme excellence, or the reverse, is surprisingly potent for good or ill. Furthermore, it is true that entire uniformity, even of excellence, is not particularly inspiring, and is perhaps even less attractive than the unrelated conglomeration of buildings that forms our usual street facade in New York. The thing to be sought is rather variety within quite definite limits, and it is precisely this that the zoning law, plus the natural working of economic factors, is bringing about in New York.

The zoning law operates in two ways to bring this about: first in its definition of "use" districts, the segregation of manufacturing plants from retail dealers, and of both from the residence districts; and in the limitation of heights in various parts of the city and on various streets. The limitation of uses tends to uniformity, because each class of activity requires buildings of generally similar characteristics; but the natural desire for individuality keeps these buildings from being standardized to monotony; likewise the limitation on heights tends to establish a definite cornice line on any street within the limits of a height district, although it does not tend to establish uniform cornice heights within an entire district, since the height requirement is dependent upon the street width and not upon any arbitrary figure. Perhaps it should be explained that the law divides the city into districts, in each of which the allowable height of the street facade has a definite relation to the width of the street, this varying from street width to 2½ times the width of the street, so considerable variety of height is possible.

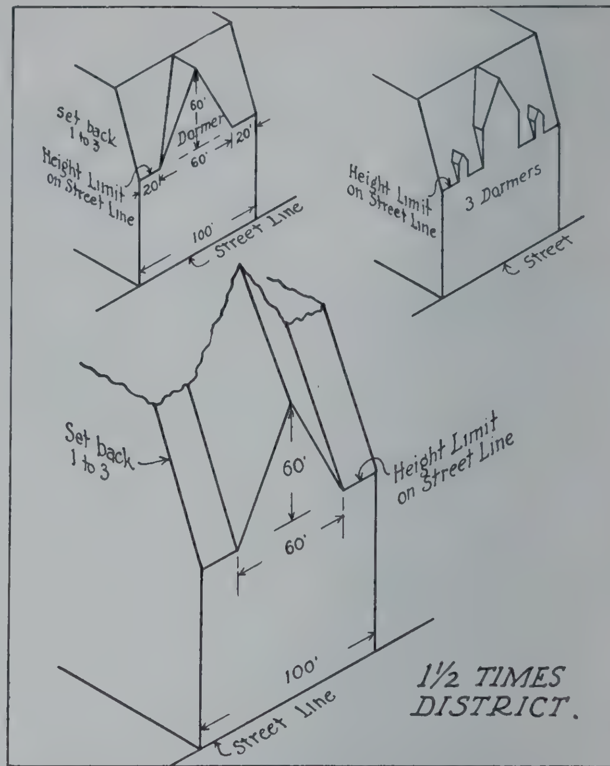


Diagram Showing Provisions for Dormers, New York Law


View of Heckscher Building, Looking North on Fifth Avenue
Warren & Wetmore, Architects

But the most interesting (to the architect) of all provisions of the zoning law is the peculiar and most effective manner in which heights are limited. The limit is not on the total height of the building but on the vertical height at the building line. Above that height, buildings may be extended providing that portions above the limiting height do not extend beyond a diagonal line drawn through the center of the street and the limiting height at the street line. Dormers of considerable extent are permitted, and other provisions of less, although very real, importance affect the height on the rears of lots, on courts, side streets, etc.

Roughly speaking, the law provides that above the height limit all structures must be contained within a cone of about 75° slope, so that a very large building may have considerable space above the height limit, while the small building has practically none. Here is

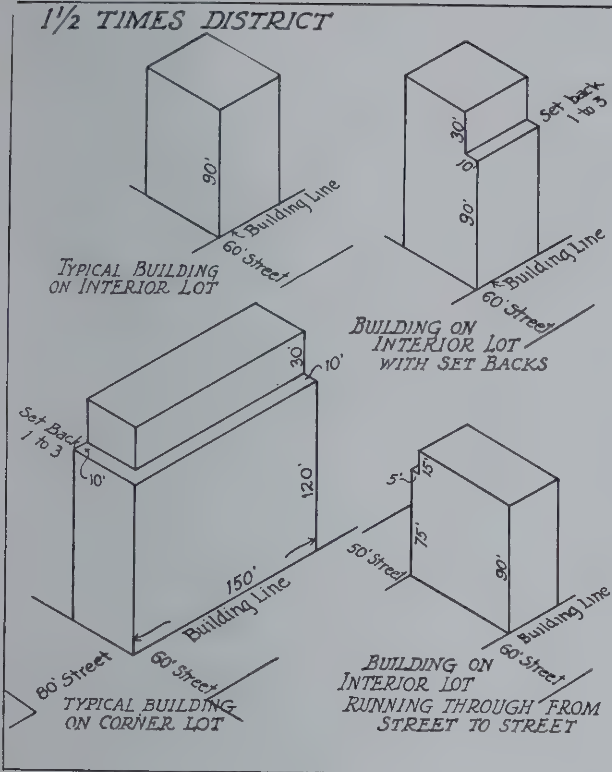


Diagram of Height Limits in 1½ Times Districts

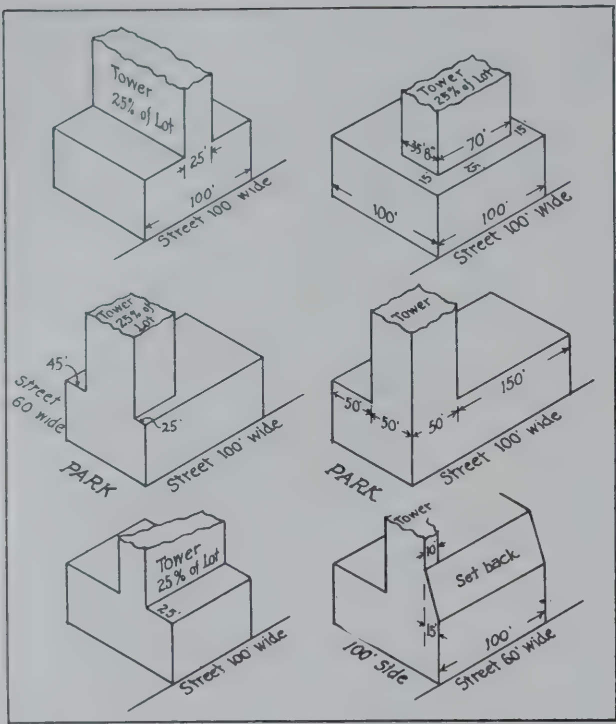
where the principal new architectural problem is found, a twofold problem in that very great skill in plan is needed to make it economically desirable to build small structures at great heights, with the necessary elevator service, and that once more our designers of New York buildings have an opportunity of designing in three dimensions instead of two—to design buildings and not facades.

From the economic point of view the problem is genuinely difficult; in the first place, it is obvious that the more floor space one is able to obtain, the more elevators are needed; floor space can be increased by adding stories, but additional elevators need area and decrease the available square feet of rentable space. It is also true that a given area on an upper floor requires more elevator capacity than the same area on a lower story, because of the time required to get to and from any considerable height; so that if we utilize our cone above the height limits to its fullest capacity, the upper story or two would contain nothing whatever but the elevator shafts.

Very few architects can or will design a structure with no reference to its appearance, so that the design of the stories above the height limit is generally a compromise between the silhouette which the architect wants and what seems economically best. The actual volume permitted by the law could be enclosed within slanting roofs were the maximum of space the sole consideration, but the multitude of small, superposed dormers required for lighting such space would be neither architecturally nor practically satisfactory. It would also be quite possible to step back each floor so that it comes within the limiting line, but this would be extremely difficult to manage in a satisfactory architectural manner, and the practical difficulties in such construction would make the cost incommensurate with the available office space obtained; the spacing of the main columns in the lower stories would have to be arranged primarily with regard to the loads at the top of the building and not for economical steel construction or convenient room arrangement on the principal floors, a thing manifestly impracticable. Thus far the buildings have been treated in a series of irregular steps, varying in height from one to five or six stories with the horizontal step-back generally equal to the column spacing.

It can be seen that on a square or symmetrical lot, or on a lot which is not excessively irregular, an exceedingly interesting terminal motive is possible; the problem offers a far wider range of treatments than did the facade on one or two streets, which used to be our problem, and the value to our skyline will be incalculable if for no other reason than because our buildings will be finished on all

View of Heckscher Building from East 57th Street
Warren & Wetmore, Architects



Principles Governing Design of Towers, from New York Zoning Law

sides, and not left with raw and naked sides and backs. Unfortunately, symmetrical lots are not always possible, and in such cases the architects are up against a problem not entirely dissimilar to the old problem of facade, since they are compelled to choose one facade, or rather one point of view, from which the building is most commonly seen, and to develop that appropriately, letting the back or the back and one side take care of itself. Carrere and Hastings and Shreve, Lamb and Blake had exactly such a problem in the Fisk Building, and very properly considered the northern side of the building, which can be seen from many parts of Central Park, and from Eighth avenue, Columbus circle, and Broadway nearly in full elevation, as of great importance and demanding a symmetrical treatment; while the south side of the building, which can be seen only at acute angles, and from certain rather restricted viewpoints, was comparatively disregarded. Even the satisfactory northern facade was possible only after a special ruling on the part of the authorities, for the design as finally executed technically violated the law, although practically it shut off less light and air from the surrounding properties than would a building which adhered literally to the restrictions of the Code. This was due to the boundary streets having different widths which would have imposed two cornice heights and created an unsymmetrical mass. The Commission accepted a solution in which the heights were averaged. Fortunately, the law permits deviations from its literal reading where such variations are manifestly for the public good, and the board is willing to consider these in a broadly intelligent manner; however the path to the board is purposely made difficult, so that it can be reached only if the object to be attained is of real importance.

The other building designed by Carrere and Hastings and Shreve, Lamb and Blake and illustrated in connection with this article, the Liggett Building on the corner of 42d street and Madison avenue, is situated on a piece of property of somewhat irregular shape, but of which a sufficient part is nearly enough symmetrical so that the portion of the building above the height limit can be treated as a symmetrical, tower-like structure. The height limit of this building occurred at the 16th floor, where the principal cornice of the building is placed, and the small tower-like corner extensions of the 16th story are made possible by the provision regarding dormers. The sloping limits of the cone enclosing the part above the height limits are tangent, or nearly so, to the cornice of the 16th floor and of the 22d floor. Above the 22d floor another step-back would have been necessary, but the architects evidently felt that the available office space, which would remain after the stairs, elevators, toilets, etc., had been deducted, would not repay the owners for further construction in height. It may be argued that only a portion of the battery of elevators need necessarily go higher, thus saving a certain amount of space; but the practical difficulties of operating only a few elevators to certain stories, and these for a comparatively small number of tenants, made further extension not worth considering.

The Heckscher Building is the latest of the New York structures to be completed under the provisions of the new Code, and, like the Fisk Building, was designed to be considered especially from the north, where it faces Central Park and is a very prominent object in the city skyline for several miles. The property on which this structure is built is of sufficient size so that the building could be agreeably designed from the sides as well as from the front, and the principle on which the building is stepped back is readily to be seen from the illustrations. In this case the cone enclosing the part of the building above the height limits is in part actually constructed as a roof of the tower, and the silhouette of the building is perhaps as attractive as that of any in the city with the exception of the Woolworth Tower.

The Ambassador Hotel is the only tall building constructed under the Code, other than an office or loft building, which occurs to me and since this hotel is on a lot which is in the main square but with the northerly Park avenue corner extremely narrow, the treatment of the upper stories in plan must have been much more difficult than would appear from the completed structure. Here only a comparatively small extension above the height limit was made, perhaps because the hotel was large enough for economical operation without additional rooms, or more probably because the more or less complicated plan of the modern hotel made it im-

practicable to raise the structure very much and still give proper rooms. It can readily be seen that an office building offers a much easier problem in this connection than a hotel or an apartment house, since in very large offices a considerable amount of artificially lighted space can be used without inconvenience for storage, for foyer halls, or other purposes of that kind, so that the total thickness of the mass of the building may easily be 60 to 80 feet, while in hotels or apartment houses, where all rooms must have outside light, the thickness of any wing will be determined by the width of two rooms plus the necessary corridor and elevator space, etc. This will amount, as a rule, to not over 44 feet, and it is impossible to get a step-back of more than one or two stories which will comply with the law and which will leave space for rooms.

Fisk Building from 58th Street

The architectural treatment of the tall building has never had the final word said about it. The Woolworth Building, perhaps the finest example of tall building in America, is, as far as its exterior treatment goes, more expensive than is commercially practicable for the average building; nor is this expense entirely unnecessary to the result, since the great difficulty of architectural composition in the tall building is that the window openings themselves are extremely small as compared with the mass of the building and the frequent duplication of small openings with narrow piers between, on a mass of great bulk, is extremely difficult to handle in any of the traditional styles excepting Gothic, and that is obviously the most expensive style in which to work. In the classic styles the proportion of openings must bear some definite relation to the size of the order employed, and the architects of tall buildings have endeavored to solve the problem in several ways, of which none has been completely satisfactory. The superposition of orders, as in the case of the St. Paul Building and the American Telephone & Telegraph Building, is completely unsatisfactory, even when the orders themselves are as beautifully proportioned as those of the latter building. A more common attempt at solution has been to endeavor to include within a single order several stories of windows, with large masonry openings, the floors and partitions between rooms being cared for by metal mullions and transoms within the masonry openings. The most successful of all buildings of this type is probably McKim, Mead & White's alteration to the old New York Customs House, but even this building, although not very tall, cannot be said to be completely satisfactory. The most common treatment of our later buildings has been to indicate the classic character of the building by orders applied at the base and less often at the crown with a plain shaft pierced with undecorated

Upper Stories of Younison Building, West 35th Street, New York
Geo. & Edw. Blum, Architects

windows. This is in a way begging the question, because the order is used purely as an ornamental appendage, although its use as an ornamental motive is perfectly defensible. When this use of the order was comparatively new, it was objected to on the grounds that the steel framework of the structure was insufficiently expressed. Now that we have been accustomed to this, and from seeing examples of steel construction in constant progress before our eyes we have learned what the skeletons of our tall buildings are, we have become used to the conventional form of covering these structures and it no longer seems unreasonable.

Now whether the conventional facade is really the best that could have been obtained is no longer of such great importance, since we are again compelled to design in three dimensions; but I am by no means sure that the few buildings which have been built under the new zoning law are steps in the right direction toward a proper solution of the problem, although certain features are unquestionably right. These new buildings seem for the most part to be adaptations from the facade designs of tall buildings. In other words, the upper order has been wrapped around the four sides of the structure, not supporting the cornice on the street facade, but stepped back on a sort of platform; and we are having a series of buildings set one upon another, rather than single buildings decreasing in size as they mount. Whether this solution is the only one practicable because of the expense of any other form of design, I am not prepared to say, although it seems very likely; but so far none of our tall buildings exhibits quite the continuous growth from base to summit that an architect would like to see. The nearest, perhaps, to this ideal is the Cunard Building,* but I am informed that the zoning law had little effect upon its design. Of the other new buildings, the Heckscher Building most nearly approximates the ideal—at least there is unity of design apparent from the base to the summit; the scale appears from the street level to be unchanged throughout its height, and the silhouette is excellent. The problem was however much less difficult than in the case of either the Fisk or the Liggett Building, and the necessity for the extreme of commercial economy of space was not apparently necessary.

One of the happy by-products of current design is the elimination of wide overhanging cornices; a reminiscence of the time when every building was supposed to be crowned by a cornice which bore a very direct relation to the height of the facade. With the increase in height of our office buildings the size of the cornice was increased so tremendously that its cost overbalanced its questionable artistic value. I think we can safely say that the wide projecting cornice has been done away with for good and I, for one, am glad to see it go. Its usefulness had been long outlived.

Upper Stories of Aronson Building, West 36th Street, New York
Schwartz & Gross, Architects

Another difficulty in the design of our tall buildings is the overwhelming amount of glass required for show windows on the lower stories, and these have been in no way affected by the zoning law. Its principal benefits have been the standardization of the heights of buildings, thus eliminating the bare, unfinished sides which have so long been eyesores in New York and have made our buildings look like stage scenery, and the enhancement of the silhouette above the cornice line. The experiments thus far made, great as they are in expense, have been comparatively few in number; but the skill of our architects has so increased in the past 20 years that these more or less tentative efforts have a certainty and a rightness of design that earlier architectural experiments in new fields were not able to show.

The accompanying illustrations have been selected to give a representative idea of the work thus far completed under the zoning law restrictions. They are restricted to office and loft buildings, of necessity since construction of other types of building has been very limited; they illustrate a variety of methods of design, however, and provide a good basis for work in the future.

*The Forum, July, 1921.

Making the New York Zoning Ordinance Better

A PROGRAM OF IMPROVEMENT*

By HERBERT S. SWAN
Executive Secretary, Zoning Committee, New York

THE 25th of July this year marked the fifth anniversary of the beginning of zoning in New York. Five years is not such a very long time, yet it is sufficiently long to permit the merits and demerits of a legislative measure to evidence themselves. An appraisal of the actual effects of the law, at this time, may prove of value not only in strengthening and improving its provisions but in cautioning other communities, which have not yet adopted zoning, what to avoid if they are to derive the maximum benefit from the operation of a zoning ordinance. The object of this paper will be, therefore, to point out steps which will tend to facilitate the administration of the law, to simplify its provisions so that they may be more readily understood by the architects, builders, real estate men and owners who must daily apply its regulations to concrete cases, and to suggest measures for remedying some of the defects and weaknesses which experience has shown the law to possess.

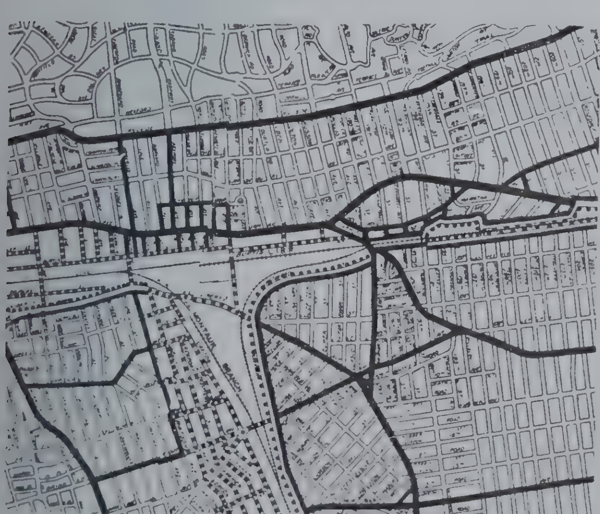
The numerous benefits conferred by the law will not be recounted here. Although our discussion will frankly be a critical inquiry into the shortcomings of the law, we do not wish our position misunderstood, for zoning has proved and is proving of incalculable benefit to the city. That it has positively demonstrated its worth in stabilizing and enhancing property values, and that it is directing the growth of the city along constructive and intelligent lines are matters of such common knowledge that it is superfluous to dwell upon them. Everybody agrees that zoning has justified itself in practice—even the skeptics, who doubted the expediency of adopting it.

THE COMPLEXITY OF THE ORDINANCE. A criticism repeatedly lodged against the zoning ordinance is that, viewed simply as a piece of bill drafting, completely ignoring the wisdom or unwisdom of its substance, the ordinance is so involved and complicated in its form and method of statement as to render its meaning obscure and sometimes unintelligible. This comment may probably not be altogether unwarranted for it is not an infrequent occurrence to find people who differ fundamentally in their interpretation of the ordinance, and upon occasions to find some persons interpreting the ordinance in radically different ways at different times.

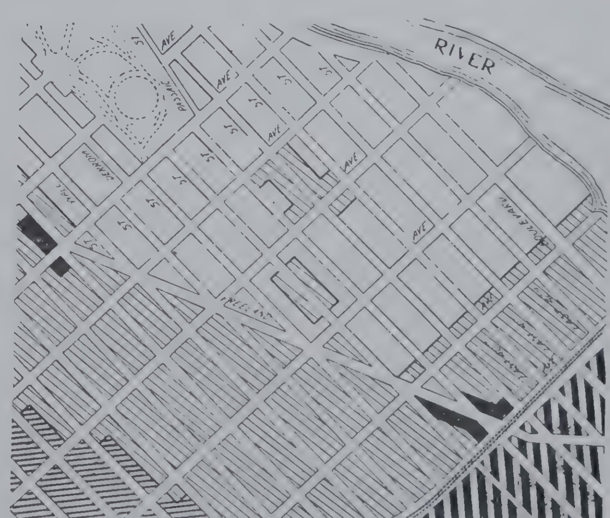
It is quite true that this uncertainty in interpreting the law has resulted in untold enbarrassment to both administrative officials and the public. Officials have wished to enforce the law, but not being clear as to its provisions, have hesitated and done nothing; owners have wished to obey the law but, failing to understand it, have ignored it. It is not true that the zoning law is not enforced in New York; the zoning law, being what it is, is probably enforced as well as can reasonably be expected—the point is that, were the law more definite and precise, it could be administered far more effectively, easily and satisfactorily than is done at present.

Take the rules governing the application of the map designations as an illustration. The different zones in New York are not laid out and bounded upon a map; instead, different symbols are used to designate the streets, each street or part of a

* The opinions expressed in this paper are the writer's own personal views



Part of the Borough of Queens Use Map. There are three zoning maps in New York, the height, use and area maps, each independent of the other, with overlapping zones and different map designations.



Part of the Paterson, N. J., Zone Map. The height, use, area, building line and family per acre limitations are all combined in one set of regulations. Zones are shown within block lines instead of street lines as in New York.

A Suggestion for Simplifying the New York Zoning Map

street constituting a zone or part of a zone, according to the sphere of influence exercised by the symbol or symbols used in the adjacent street. The complexity of these rules may be suggested by mentioning the fact that in the zoning commission's report, the ordinance itself, containing all the regulations, occupies but 13 pages while the 26 rules relating to the map designations and the 38 illustrations demonstrating their application, occupy 10 pages. Without these rules and the illustrations accompanying them, nobody could possibly define the areas situated in different zones, and even with them, some people experience the greatest difficulty.

The simplicity and directness of method used in constructing a zoning map proves of inestimable help in enforcing an ordinance. The method used to designate the different zones should certainly be simplified at the first opportunity. Symbols in the streets with spheres of influence should be entirely abandoned and in their place designations applying to the land itself substituted. When so much of each block as may be within a different zone is shaded or cross-hatched in a different manner, every property owner will know exactly how his property is zoned. In Newark, for instance, rules defining the extent of the different zones occupy exactly eight lines of type. Their brevity and clarity not only enable everybody to understand and remember them, but to determine instantly in what zone any parcel is located.

The New York ordinance contains three separate and distinct sets of maps,—one for each of three sets of zones, one for the use regulations, and one for the area regulations. When it is recalled that each of these maps outlines from three to five different kinds of zones, not co-terminous with one another, the complexity of the regulations becomes apparent. Theoretically susceptible of 75 separate and distinct combinations, the regulations are actually applied to the ground in such a manner as to form 36 kinds or classes of zones.

The Advantage of a Single Zoning Map. If the height, use and area provisions could be combined into a single set of regulations and the zones shown upon a single map as has been done in some of the more recent ordinances, as in Montclair, for instance, the administration of the law would be very appreciably simplified. Instead of having to examine three different maps to ascertain how the zoning regulations affect his plot, the property owner would have to examine but one.

Desirability of Establishing a Fourth Use Zone. The ordinance establishes three classes of use zones. The residence zones exclude all kinds of business and industry; the business zones all kinds of large manufacturing establishments occupying buildings more than one story high, and nuisances. Nuisances, unfortunately, are not excluded from the industrial zones. The effect of this provision is to afford insufficient protection to manufacturing. If a factory requires more than 25 per cent of the floor area in a building, or a floor area in excess of the lot area, whichever is the greater, it is forced into the unrestricted zones containing all kinds of nuisances.

To put manufacturing establishments and nuisance uses into the same classification has produced many unhappy compromises, as every unrestricted zone was the result, more or less, of a balance struck, on the one hand, between the just claims of the district for factory development and, on the other hand, the protection demanded by neighboring residence and business zones against nuisances. In some instances, nuisances were allowed where they would do great harm for no better reason than that the locality was naturally a manufacturing district; in other cases, factories were prohibited on the ground not that *their* admission was undesirable, but because the nuisances that might slip into the district with them would prove a serious menace to adjoining business or residence zones. Four classes of zones — residence, business, manufacturing and nuisance — should be established at the first opportunity to correct this defect in the ordinance.

Factories in Business Zones. At the same time that a fourth zone is established to protect light from heavy industry, it would seem desirable to modify the rule governing manufacturing in the business zone. At the present time, a one-story factory may locate anywhere it chooses in the business zone. The admission of such factories to business zones deprives business of much needed protection. It also acts as a standing threat to the security of such residence zones as may adjoin the business zones.

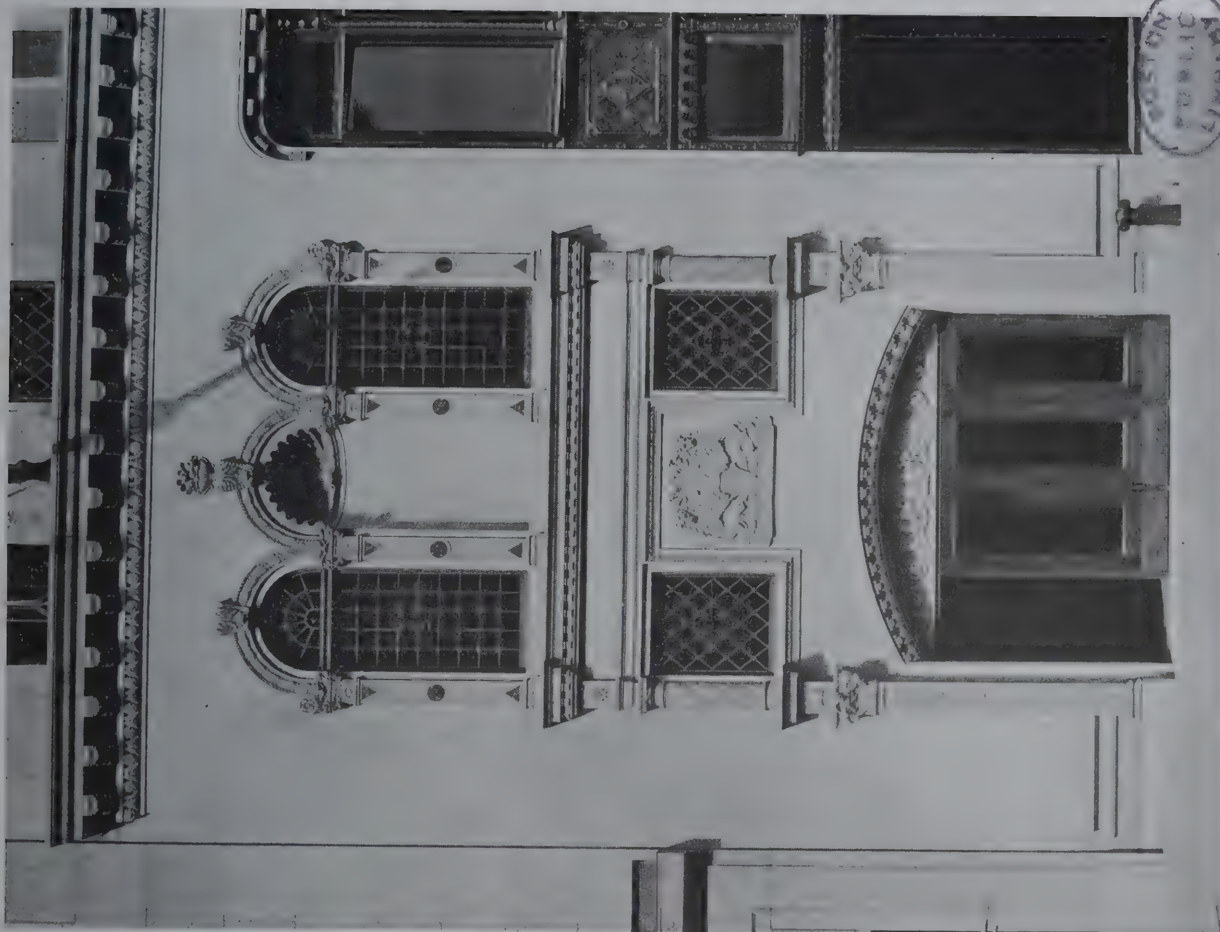
The provision permitting 25 per cent of the floor area in a building to be used for manufacturing, where such an area exceeds the lot area, was included in the ordinance to permit such manufacturing in business zones as may prove necessary as an incident to the conduct of a retail business. As a general proposition this proportion of the floor area has proved ample for the manufacturing needs of retailers, though there are cases on record where it has worked distinct hardship to businesses admittedly desirable in business zones. The fault to be found with the provision is not so much on the ground that it unnecessarily cramps milliners, modistes, custom tailors, etc. in the space they may occupy for their workrooms, as that it permits out-and-out manufacturing in business zones, whether or not it is an incident to a retail business. Then, too, the provision is all but impossible to enforce. A reasonable rule to follow would seem to be one which permitted as much or as little space to be used for manufacturing purposes as might prove essential to the conduct of the retail business to which the manufacturing should be an incident.

The "E" Area Zones. Much has been written and said about the "E" area zones. Some people frequently refer to them as the "30 per cent zones," although this is a misnomer, for instead of being

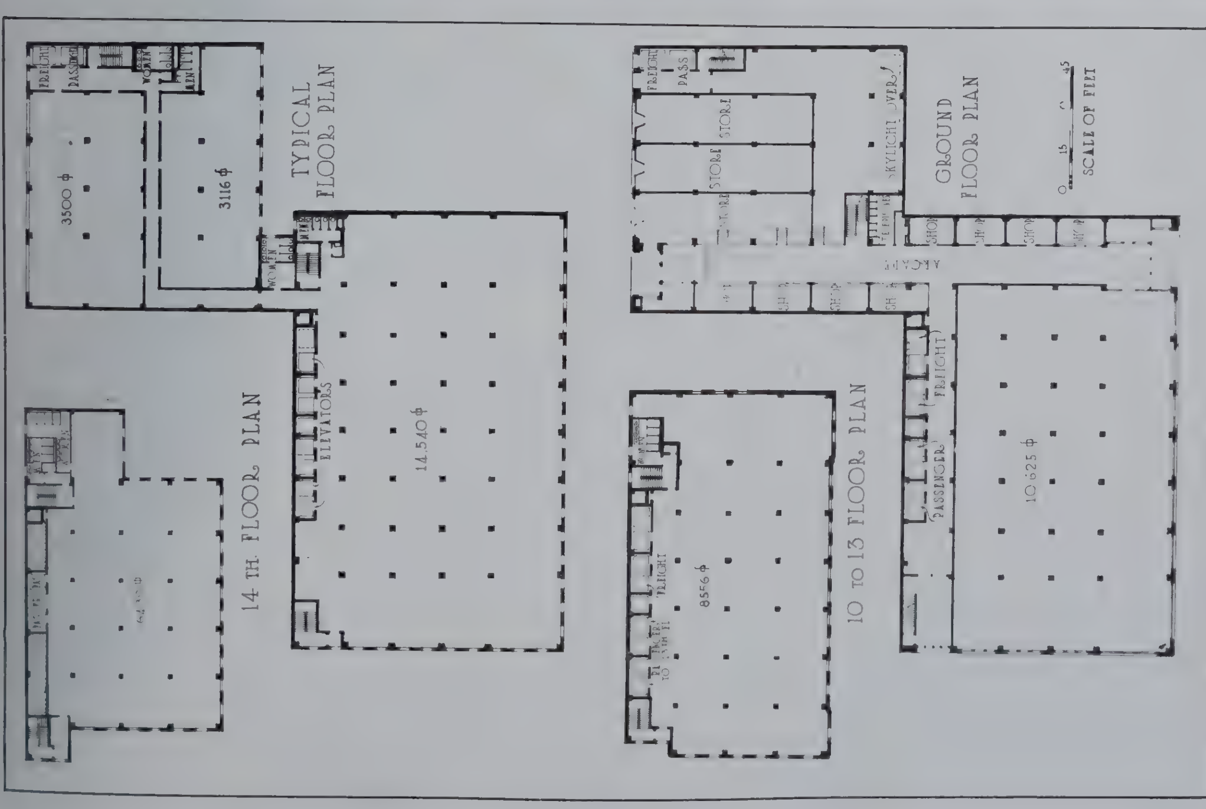
57TH STREET FACADE FROM UPPER FIFTH AVENUE

HECKSCHER BUILDING, NEW YORK

WARREN & WETMORE, ARCHITECTS



FIFTH AVENUE ENTRANCE DETAIL



PRINCIPAL FLOOR PLANS

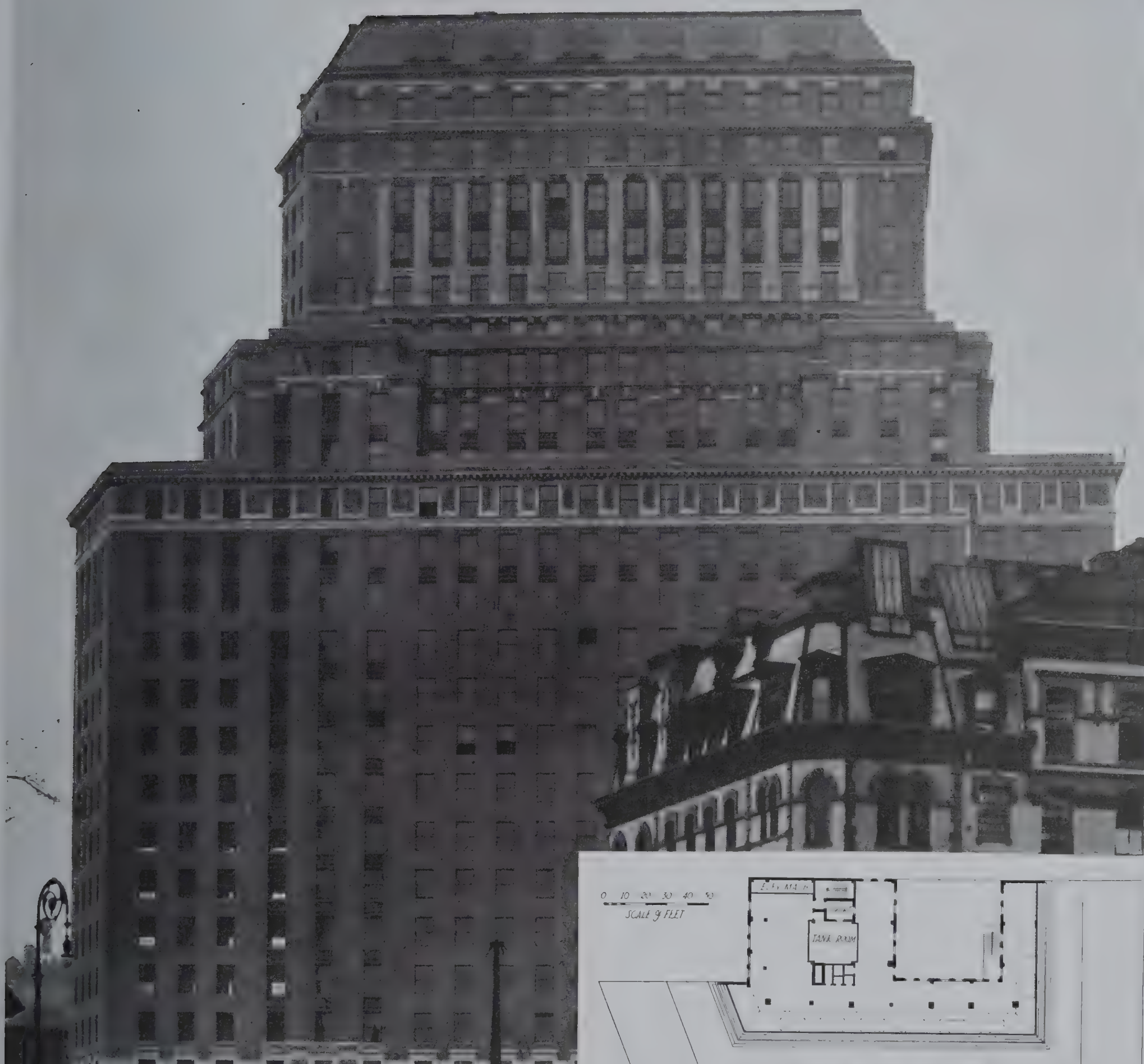
HECKSCHER BUILDING, NEW YORK

WARREN & WETMORE, ARCHITECTS

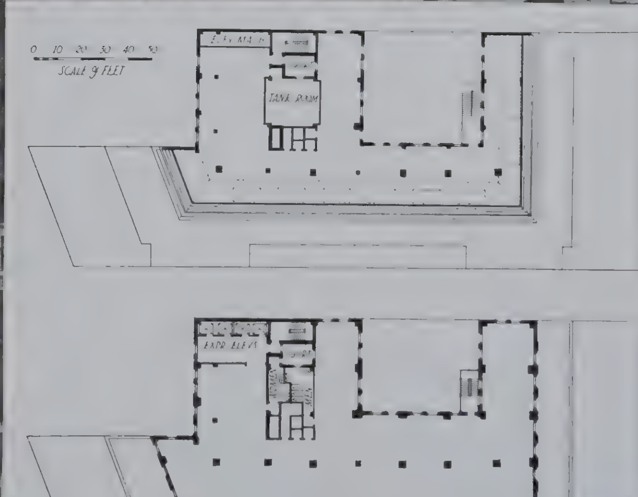
DETAIL OF TOWER AND TOWER PLANS

HECKSCHER BUILDING, NEW YORK

WARREN & WETMORE, ARCHITECTS



58TH STREET FACADE FROM COLUMBUS CIRCLE

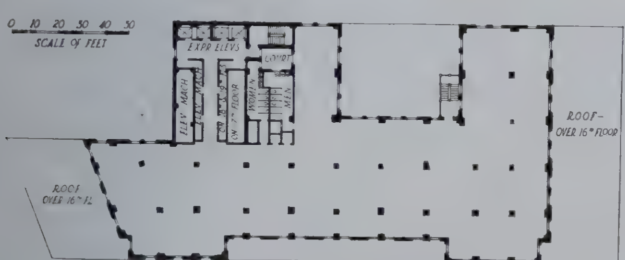


PLANS OF TWO TOP FLOORS

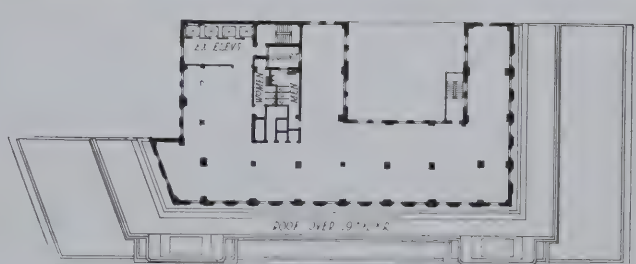
FISK BUILDING, NEW YORK

CARRERE & HASTINGS, ARCHITECTS; SHREVE, LAMB & BLAKE, ASSOCIATED

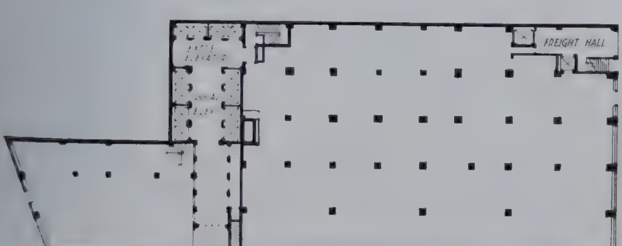
DETAIL OF LOWER STORIES



17TH TO 19TH FLOOR PLANS



20TH TO 24TH FLOOR PLANS



FIRST FLOOR PLAN

3D TO 16TH FLOOR PLANS

FISK BUILDING, NEW YORK

CARRERE & HASTINGS, ARCHITECTS; SHREVE, LAMB & BLAKE, ASSOCIATED

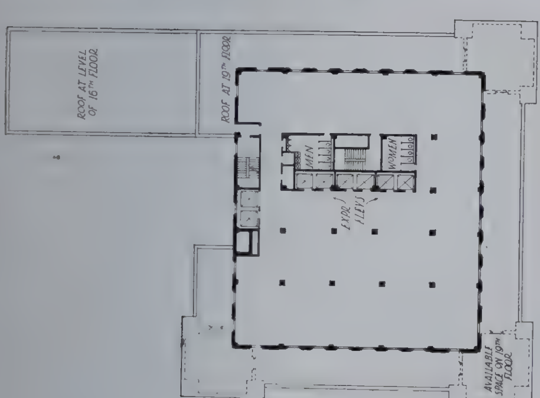
MADISON AVENUE AND 42D STREET FACADES

VIEW FROM PARK AVENUE VIADUCT

LIGGETT BUILDING, NEW YORK

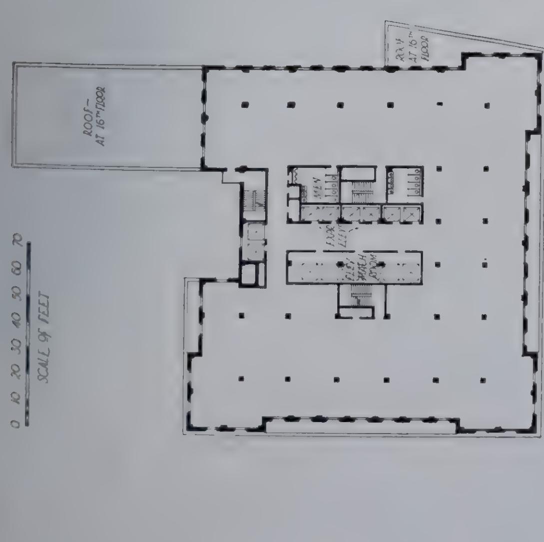
CARRERE & HASTINGS, ARCHITECTS; SHREVE, LAMB & BLAKE, ASSOCIATED

DETAIL OF UPPER STORIES

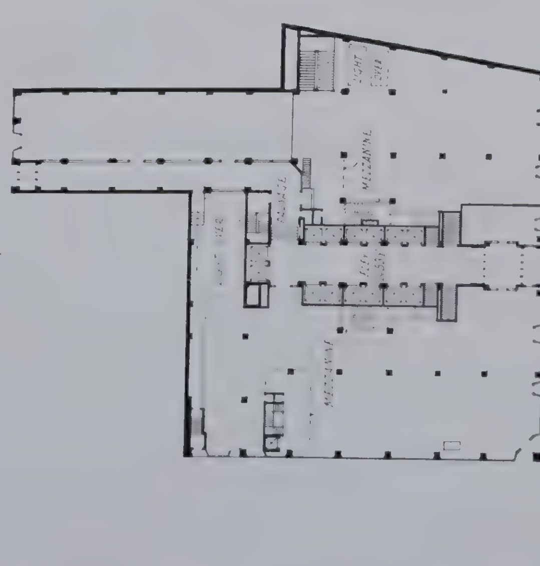


19TH TO 23D FLOOR PLANS

3D TO 12TH FLOOR PLANS



17TH FLOOR PLAN



FIRST FLOOR PLAN

LIGGETT BUILDING, NEW YORK

CARRERE & HASTINGS, ARCHITECTS; SHREVE, LAMB & BLAKE, ASSOCIATED

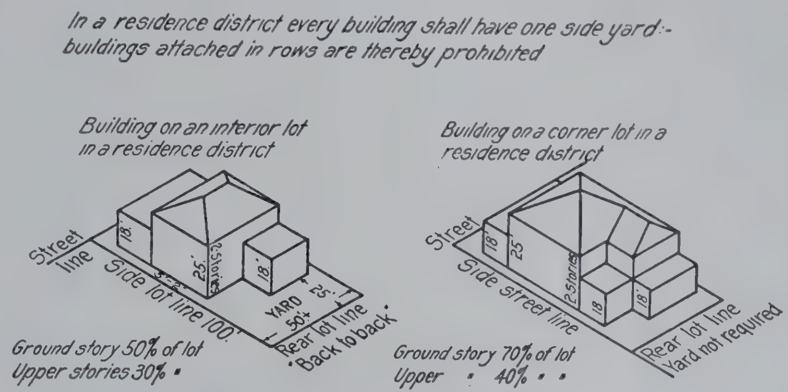
limited to 30 per cent of the ground area, buildings may, in the case of interior lots, cover 50 per cent of the ground and in the case of corner lots, 70 per cent of the ground. At a height of 18 feet above the curb, these percentages are respectively reduced to 30 and 40 per cent of the ground.

It was hoped that the large amount of open space required around buildings in the "E" zones would exclude apartments. In the main, this hope has been realized since but one apartment has been built since the adoption of the ordinance in an "E" zone. The fact that one apartment has been built is, however, portentous for the future. Certainly it would seem wise to devise more effective means of excluding the apartment from private house zones than a zoning restriction which affords the possibility of erecting buildings covering 30 per cent of the lot up to a height of once the street width, and covering 25 per cent of the lot to any height above once the street width as the builders might choose. There is no means of knowing when a private house area, even though situated in an "E" zone, may be transformed into a district of towering apartments.

Different means may be resorted to in guaranteeing a more assured and stable future to private homes. A lower height limit, if a flat one, would in itself go a long way in this direction. The highest class residence suburbs in the vicinity of New York, such as Glen Ridge and White Plains, for example, prevent buildings in their best zones from having a greater height than 35 feet. This excludes buildings more than 2½ stories high. In addition to this, these suburbs limit the number of families to the acre, eight, nine or ten families to the acre being a very common restriction in the most highly protected zones. This provision, of course, makes the large apartment impossible. Surely private houses should be afforded as much protection within the city as neighboring suburbs under the same conditions accord them. In this matter, then, it may prove advisable to review not only the percentage of the ground area which a building may occupy, but also the provision requiring but one side yard. Many communities in the vicinity of New York, having a development no better than that found in various sections of the several boroughs, demand two side yards and limit buildings at the ground to 25 or 30 per cent of the lot areas.

Building Lines. A subject that should also receive immediate attention in these districts is that of establishing building lines. At the present time, buildings may be built out to the sidewalks even in the most protected zones. New York may well profit by the example set by Paterson, where no building in the residence districts may project beyond the average setback line at present observed by the buildings on the same side of the street within the block. Where there are buildings now on only one side of the street within the block, then the setback line on the vacant side must be the same as the average setback line on the improved side. Where there are no buildings on either side of the street, a uniform setback line suited to the requirements of the type of building anticipated in the district is established on both sides of the street.

Families per Acre. The great outstanding bane of New York life is the congestion of population.



Typical Examples of Building in Area "E" Districts (Residential) in New York

Bad as it is, one would scarcely believe that it could become worse, and yet this is the appalling fact. A density that was deemed "bad" a few decades ago is thought "good" today; what was intolerable then is now rapidly becoming the average. The worst conditions affecting land overcrowding in 1921 would have been thought beyond belief a generation ago and still the process keeps right on, scores being jammed into the same space formerly occupied by tens, the houses built bigger and taller, the rooms both narrower and shorter, and the apartments containing fewer and fewer rooms. This evil the zoning ordinance leaves untouched. Tenements may be built substantially the same as before the enactment of the law.

Other cities, commencing with Newark in 1919, have decided that such congestion should not be allowed within their borders and that there is a limit to the number of families that can live on a unit of ground beyond which they cannot be housed decently, and that this limit shall not be transgressed. If the number of families to the acre is limited *now*, large areas in the Bronx, the greater portion of Brooklyn, practically the whole of Queens and all of Richmond can still be saved to civilized standards of living. Let the opportunity of doing something pass now and it will only be a question of time, provided the population of the city continues to increase, until east side conditions will extend to every part of the greater city.

Dwellings in Industrial Zones. The "A" area zones in New York are practically unrestricted zones. No open spaces of any description are demanded—buildings may occupy the entire lots. In these zones the only requirement governing the erection of buildings is that any court or yard pro-

vided as the sole means of lighting or ventilating rooms shall not be less than one inch in width for each foot of building height.

The "A" zones embrace, as a rule, all the localities set aside for industrial purposes. Now, it is perfectly proper not to exact as much open space from industrial structures as from residential buildings, but the regulations governing the "A" zones affect the two classes of buildings in identically the same manner. In other words, the "A" zones have unwittingly been made asylums for all classes of residential buildings which may feel themselves unduly oppressed by the area requirements exacted in the B, C, D and E zones. Residential buildings should positively not be allowed in industrial zones unless they conform to as high standards in the way of courts and yards and other open spaces as are required in the least restricted residence zone. To demand lower standards for dwellings in the industrial zones than in the residence zones can in the long run only result in creating the very kind of a situation zoning is designed to remedy.

Rear Yards. The New York ordinance requires rear yards only in the cases of such interior lots as are back to back with other interior lots. Interior lots backing upon corner lots need not provide rear yards, nor interior lots the rears of which happen to be within 55 feet of any street. Corner lots, no matter how large or how situated, as well as through lots, are also exempt from the rear yard requirement. With the exemptions the law allows, it is possible to build up entire blocks without providing a single rear yard. In many instances where the law does demand a rear yard, the requirement may be such an isolated instance as not to serve any real purpose.

In residence sections it would seem eminently fair to exact a rear yard in the case of every lot, other than a through lot having a certain depth, whether the lot is an interior lot or a corner lot, a lot back to back with another lot or a lot back to side with an adjoining lot. In business and industrial districts, situated as these are in New York, the provision requiring a rear yard could very well be eliminated entirely. To insist on a rear yard in the case of every interior lot would seriously hamper the erection of efficient business buildings. With blocks only 200 feet wide it is, of course, absolutely necessary to permit buildings to run through the block from street to street as it would be impracticable to limit the depth of large stores, theaters and office buildings to 100 feet. When this concession is made to through buildings, there is little object in requiring all buildings that do not run through the block to be equipped with rear yards. Rear yards, provided on isolated lots scattered here and there through the block between through buildings or corner buildings, do not help the ventilation in the block any more than inner courts.

A deep building, however, with three dead walls, obtaining all its light and air from but one side, is a bad structure. Daylight and ventilation, other than that coming through the front windows, must be provided to obtain a satisfactory building. But this result can be accomplished by limiting the maximum per cent of lot area that the building may occupy and leaving the choice of the open space used, whether it be an inner court, an outer court, a side yard or a rear yard, to the builder.

Operation of the Height Regulations. It is quite natural that the provision in the New York ordinance to attract the most widespread popular attention should be that regulating the height of buildings. As the time since the adoption of the ordinance lengthens, and the number of skyscrapers erected under the law multiplies, the more conspicuous is the effect of this provision. Each new high building, because its facade must be set back in steps, terraces or mansards with each unit of increased height, tends only to enhance the public's interest in the height regulations of the ordinance.

Though the effect of the height

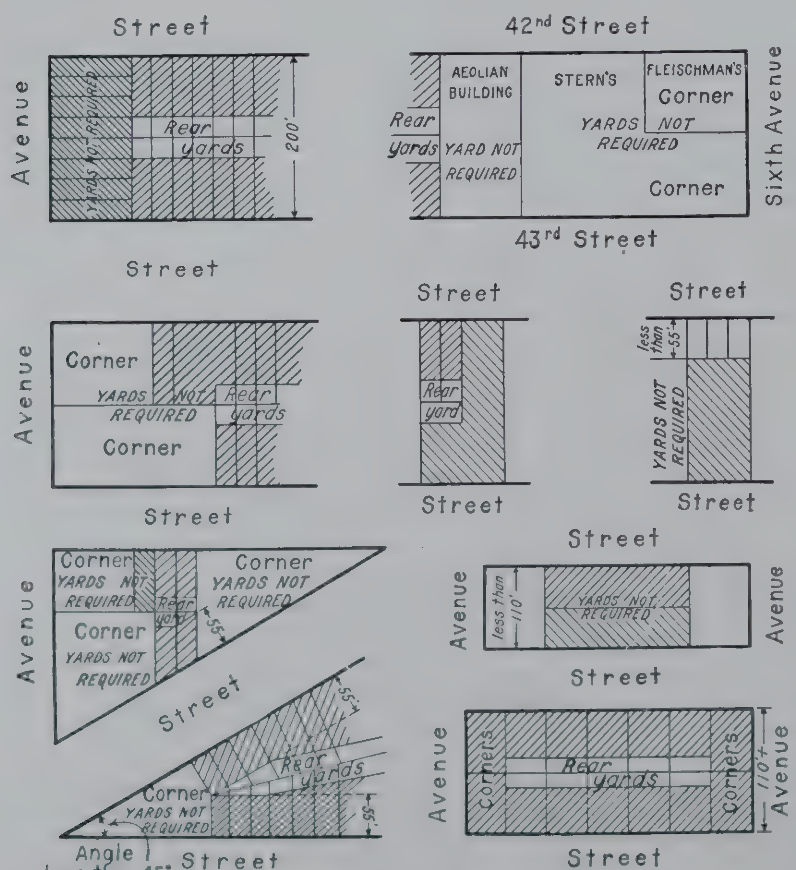


Diagram Showing Rear Yard Requirements under Various Site Conditions (New York Law)

regulations may be the most outstanding result of the New York ordinance to the casual eye, especially to the occasional visitor who seldom gets out of the Times square district, this is in reality far from the truth. The height regulations benefit but part of a single borough; the use regulations benefit all the boroughs. Below 59th street, in Manhattan, the height regulations are certainly leaving their stamp upon the city's architecture; the front of nearly every new building erected in this section of the city recedes from the street line at a height varying between 120 and 250 feet above the curb. Outside of the section below 59th street in Manhattan, the effect of the height regulations, however, is not nearly so conspicuous; in fact, it is a rare building that is affected by them at all, for the reason that the height of buildings allowed up to the setback plane is higher than the average person cares to build.

The height regulations in New York cannot be described accurately as height limits for they do not limit the height of buildings; they merely regulate the manner of erecting high buildings. In no part of the city is an absolute height limit imposed upon buildings—a limit beyond which no building may be erected higher. On the contrary, buildings of unlimited height are permitted in all parts of the city. The basis for the regulations in the different zones is a multiple of the street widths. In the least restricted section, buildings may be built at the street line to a height 2½ times the width of the widest abutting street. Beyond that point, they are permitted to go up to any height their owners choose, so long as their facades are set back at the rate of one foot horizontally for every five feet of building height. The multiple of the street width used in the different zones varies, there being five height zones. The multiple in the highest is 2½ times the street width; that of the lowest, once the street width. The multiples used in the intermediate zones are twice, 1½, and 1¼ times the street widths. The setback ratio above the limiting height plane at the street facade is twice that of the street multiple, being 5 to 1 in the 2½ times zone, 4 to 1 in the 2 times zone, 3 to 1 in the 1½ times zone, 2½ to 1 in the 1¼ times zone, and 2 to 1 in the 1 time zone. For the purpose of the regulations, no street is deemed less than 50 feet wide nor more than 100 feet wide.

Excepting in the older parts of the city, few streets are less than 60 feet wide. The major streets, of course, greatly exceed 60 feet in width, many of them being 100 or even more feet in width.

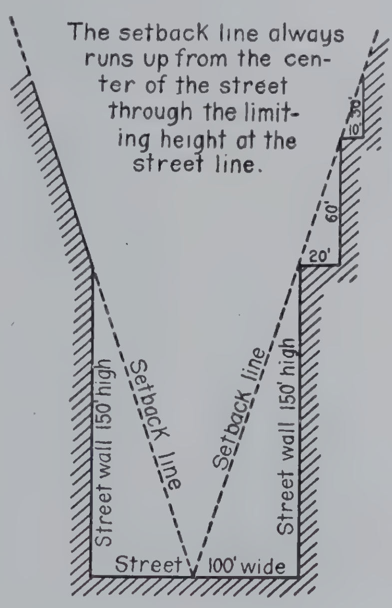


Diagram for Determining Angle of Setback
Typical Example in 1½ Times District

Towers of an unlimited height are allowed in all zones. The ruling provision governing their erection is that they shall not occupy more than 25 per cent of the lot area and that they shall not be nearer than 75 feet to the center of any street.

The Setbacks. A setback obviously admits more light and air to the lower stories than a vertical wall. In New York, however, the setback ratio is not the same as the street multiple. In the highest height zone, for example, each foot of street width below the setback plane will admit of 2½ feet of building height. Above the setback plane, however, each foot of open space will permit 5 feet of building height. In this respect, the setbacks tend to put a premium upon the construction of high buildings. When the center of the street is considered, the setback plane does preserve a uniform angle of light; but when the lower stories on the opposite side of the street are considered, which is the consideration of real importance, each increase in height diminishes the angle of light. Viewed thus, the setbacks, of course, stultify themselves. To achieve their object, the setbacks should clearly be proportioned in the same ratio to the open spaces in front of them as the height below the setback plane is to the street width.

The buildings erected under the ordinance are as high in the downtown section of Manhattan as the buildings erected there before the ordinance was passed. The height regulations imposed by the zoning ordinance have not sounded the death knell of skyscraper construction. There is, however, a distinction between the old skyscrapers and those erected under the law, for the newer buildings in receding from the street admit more light and air to the lower stories than the old structures. In that respect, the ordinance is undoubtedly an advance over what we had during the days of unregulated building.

Flat Height Limits *vs.* Multiples of the Street Widths. But an increasing number of people feel that the height regulations are all too lenient, and that if the entire city is to be built up with structures of the maximum height allowed by the ordinance, the result, so far as it prevents street and sidewalk congestion and the ability of rapid transit lines to care for rush hour crowds, to say nothing of land-overcrowding and home environment, will not be what it should be, and that a general tightening up of the height provisions is therefore desirable. No one believes that a series of flat height limits would be superior to using setbacks and different multiples of the street widths.

A height limit based exclusively upon a multiple of the street width, it is true, has certain objectionable features which cannot be lodged against a flat height limit. Probably the chief among these is that it does not promote a uniform type of development throughout a district. Being based upon the street width, it allows higher buildings upon the wider streets and thus actually invites the location of buildings that will not comport with the general character of the neighborhood. High apartments in a private house zone, for instance, are only a little less objectionable than stores. The fact that they happen to be located on a wide street hardly mitigates the injury, as the blight suffered by the adjoining houses is identically the same, no matter how wide or narrow the street is on which the apartments front.

Basing the height regulations upon a multiple of the street width does not, of course, obviate the necessity of establishing general classes of height zones, each governed by its own multiple of the street width. The height limit, in a particular case, therefore, will vary not only according to the width of the street but according to the zone in which the building is located. In applying the multiples of the five New York height zones to only six sets of different street widths, 50-,60-,70-,80-, 90-,and 100-foot streets, one obtains no less than 22 separate and distinct height limits. There is often a greater difference between the height limits established for the widest and narrowest streets within a given zone than there is between the narrowest and widest streets in two different zones. Indeed, there are many instances in which higher buildings are allowed on the wider streets in a zone apparently subjected to a stringent restriction than on narrower streets in a zone with a more liberal multiple.

THE PROGRAM OF IMPROVEMENT. To summarize: A program for improving the New York zoning ordinance should provide, among other things, for:

1. The appointment by the Board of Estimate of an advisory commission of citizens to review and examine the whole zoning ordinance with the object of correcting such mistakes as experience may have demonstrated were originally committed in preparing the plan, whether such errors are contained in the detailed provisions of the ordinance or in the boundary lines of the several zones established by the zoning maps. Only by the appointment of an official commission, whose sole function it shall be to study the zoning ordinance, can we expect to obtain a serious consideration of the subject in a comprehensive and an intelligent manner.

2. The extent of the different zones should be indicated not by symbols within the street lines of the map but upon the ground itself.

3. If possible, the three different sets of height, use and area zones should be combined into a single set of zones and shown upon a single map.

4. The different kinds of zones should be reduced to the smallest number consistent with the protection required by the types of development.

5. A fourth use zone should be established for nuisances and heavy industries.

6. The provision permitting one-story buildings in their entirety and 25 per cent of the floor area in higher buildings to be used for manufacturing purposes in business zones, should be modified so that as much or as little of the floor area may be used for manufacturing purposes as the retail business, to the conduct of which the manufacturing is an incident, might require. Manufacturing not conducted as an incident to a retail business should be entirely excluded from business zones.

7. The "E" zones should be tightened up so as positively to exclude the construction of multifamily houses.

8. The number of families to the acre should be limited.

9. Building lines should be established in residence zones.

10. Residence buildings erected in the industrial zones should be required to comply with at least as high area standards as those established for the least restricted residence zone.

11. In residence zones, the provision of a rear yard should, generally speaking, be made mandatory upon every lot. In the business and factory zones, the provision of a rear yard should be left optional with the builder, the interests of light and ventilation being sufficiently secured by a limitation upon the percentage of lots buildings may occupy.

12. The height provisions of the ordinance should be revised and flat height limits substituted for multiples of the street widths.

13. Multiples of the street widths, if used to limit the height of buildings at all, should be used only as auxiliaries to flat height limits and in a manner to restrict buildings to a lower height on the narrower streets within a zone, than would be obtained by the flat height limits.

14. Whether or not flat height limits are substituted for multiples of the street widths, the height zones should be thoroughly reviewed throughout the city, especially outside of Manhattan, and lower height limits imposed.

15. Towers occupying 25 per cent of the lot areas should not be allowed throughout the city. In private house districts, this privilege may be exercised in a manner to secure apartment houses of unlimited height.

16. The setback ratio should be reduced so that the height above the commencement of the setback plane shall bear the same relation to the space in front of the building as it does below that point.

The New York zoning ordinance, being the first comprehensive, city-wide zoning ordinance adopted in the United States, cannot, of course, be considered the last word upon the subject. Like all initial things, it left much to be desired. We learn only through trial and error. Having had five years' experience, it is only natural that New York should know how to draft a better law today.

Zoning and the Architecture of High Buildings

By IRVING K. POND

ZONING of towns and cities has its roots and ramifications far back in the past; yet, as practiced today, it may be regarded as a more or less modern institution. Its relation to architecture is intimate—not, perhaps, fully perceived at first glance but becoming apparent with study and observation. The individual dwelling—the house,—and the communal dwelling—the apartment house,—were well developed in essentials of plan and design before the necessity of zoning, apart from its bearing upon town planning, was recognized; in fact, it was the desirability, not to say necessity, of preserving the spiritual character of the house and the apartment house and of conserving their material values that called modern zoning into existence. The encroachment of business and trade and industry upon the home, to the spiritual and physical detriment of the latter, was the primary reason for zoning. Now zoning protects the individual house from the overpowering apartment; the home and the apartment from business; business and trade from objectionable forms of business and trade, and from industries.

The simplest form of zoning exists in the well planned dwelling house. The elements include the basement with its heating plant, fuel bins, laundry and storerooms; the main floor with reception hall, living room, dining room, serving pantry, kitchen, store closets, maids' dining room, etc., all arranged so as to function properly without interference or overlapping; the wider stairs (or boulevards) from community rooms to individual sleeping quarters on the second floor; the service stairs to the servants' living quarters which are convenient to the kitchen and labor zones. And then the apartment building, more complicated, with all the living and domestic requirements more or less upon one floor; with individuality expressed within each apartment; with serving quarters so arranged that the service of one apartment shall not interfere with the social or individual life of its own or of another apartment; with janitors, tradesmen, callers, dwellers, all accommodated after their own manner and necessity without interference or contact or conflict with others. This is the epitome, the beginning and almost the summing up of town planning and zoning.

But one house may be a menace to other houses, one apartment building to other apartment buildings, one industrial or mercantile building to others of its own class; and so zoning has to limit, in so far as possible, the interference of the individual or the group with the rights and well being of others and of the community. Zoning has to seek to accomplish through ordinance and regulation what really civilized and humane owners and builders and really conscientious, capable and well trained architects should and would have put into effect gladly and of their own initiative. Zoning, in some localities, has had to overcome or ameliorate conditions imposed by greed and avarice under the direction of stupidity and ignorance.

It seems rather astounding, does it not, that zoning commissions, forced into being by the dire exigencies of urban existence and conditions, commissions created by and composed in greater part, or quite wholly, of non-technical elements, should be called upon to direct architecture into proper channels of expression? And yet is it so astounding after all, and so out of accord with reason? Architecture worthy of the name has grown out of the life of the people—the non-technical people—and architects worthy of the name have given that life æsthetic expression and interpretation. So arose the great architectural styles of the past; so will arise any great architectural style of the future. I would not burden this paper with the slightest discussion of this generally accepted and really axiomatic proposition were it not that a new generation, well tutored in archæology and versed in academic formulæ, is entering the field, eager to apply a newly acquired knowledge which seemingly does not include a real appreciation or comprehension of certain vital truths; and, also, that so many practitioners of an older generation seemingly have forgotten the fact, if ever they had grasped it.

The architectural schools, to my seeming, are giving scant instruction in the art of life; giving little in addition to an uncanny facility in misapplying ancient formulæ to modern conditions. Schools and license and registration boards are not doing much to supply the public with interpreters of its life and its ideals in terms of art, which includes architecture. They, the schools and boards, are providing the public with a fairly efficient lot of designers of structures, but these are not necessarily architects under the real definition. Not every seed which falls upon fertile soil germinates into a beautiful flower or a succulent vegetable; weeds predominate and spread themselves naturally. The gardener works unceasingly to produce the flower which shall be his pride; that flower which, touching human accomplishment generally, is called art—as touching buildings, architecture. I have said this to indicate that architects among builders are rare—rare even among the generality of those who have assumed the honorable title of architect—and that is why zoning commissions and other agencies are needed now and again to point the way.

Architects have known of the old mediæval streets along which the houses overhung, jutting out story by story till the gables fairly touched, cutting out light and air, so that finally to save the street and teach architects their real duties the law intervened and let the life-giving light and air enter. The architects know and apply the classic-renaissance formula for projecting cornices and string courses; and they lined modern American streets with buildings of which the wide, overhanging projections grew bolder and bolder, so as to maintain "classic proportions," as buildings increased in scale and in height. Then the law intervened and said the cornice should not project more than so far over the street line. And the architect, that he might not be hampered in the application of the formula which produced his "classic proportions," set the building back from the street far enough to satisfy the law and his own perverted taste, and wasted another's property just to gratify his own personal whim. Architects, in school and out, must have learned or heard of mediæval and renaissance experiences and how the evil was rectified, and yet they seemed not to take the lesson to heart. The most flagrant types of mediæval exaggeration seemed not to have impressed them. They seemed not to remember that from gables almost touching across the streets came a reaction in the form of two-, three- or four-storied walls surmounted by pitched roofs with three, four, five, six or seven tiers of dormer windows, while in France, led by Paris, walls were limited to certain heights, and then came setbacks, vertical and sloping, with storied dormers. From these pitched roofs developed the bulging mansard, which should serve as a warning to modern American employers of the setback not to evolve a form so generally ugly and out of human scale.

All this history seems to have been forgotten by the architects of American cities till along came the zoning commission of Manhattan and brought designers to their semi-senses;—told them how to design for light and air, for wholesomeness and right living and told them almost how to design for beauty which up to that time had been a scant element in Manhattan's tall structures, whatever visitors from over seas may have said in their enthusiasm, to the contrary notwithstanding.

The idea of the setback building is old. A "staged tower" built about 2450 B.C. was incorporated in a Chaldean palace, the oldest known structure in Mesopotamia. The Assyrian palace of Sargon and the platform on which it stands employ the motif. The "Hanging Gardens" of Babylon furnished a fine example of "setback" construction (so did the "Tower of Babel," by the bye) and indicate a use which may be made of the level spaces caused by the setback walls of modern buildings. The clerestory of the Egyptian temple, but notably of the mediæval cathedral, is a striking example of setback construction designed to get light into the interior, but more especially to compel externally the effect of unity and of resistance to time and the elements, which emotions are induced by the pyramidal form.

The idea of the setback in high buildings, even in its present form, is not new. Toward the end of the last century the subject was treated by Louis Sullivan in relation to the tall office building. Contemporaneously I, myself, had studied the proposition in relation to tall apartment buildings as may be seen by reference to the third of a series of papers on "The Architecture of Apartment Buildings" published in this journal (then THE BRICK-

BUILDER), in the number for December, 1898. Ever since my earliest observations of architecture, and study of means to ends, and especially since my early dealing with the refractory material and causing it to express my desires and design, I have had a keen appreciation of the potency of the pyramidal motif to insure or strengthen the effect of unity in a composition, as in the Greek temples (notably the Parthenon) and to establish the feeling and effect of permanence and stability, as in the pyramids. Early in my practice I began to introduce this motif into my design by setting back the faces of walls where they fell off in thickness as a concomitant structural factor. Later I began to emphasize the feature and stress the motif in brick walls by cutting out a half brick in plan at the corners, forming a sort of bevel which increased by the elimination of more brick as the walls arose. The same feature was introduced into stone walls by channeling or fluting, simply below, then more and more richly as the coping is approached. The effect of this method of pyramiding, and hence of stabilizing and unifying, may be observed in the City Club building in Chicago, designed by my firm, and also in the Michigan Union building at Ann Arbor, in which setbacks and channeled corners are featured in brick and stone. No buttresses nor external piers are used or needed to enhance the structural effect of the pyramiding, the decreasing bulk of the masonry as the walls rise being sufficient.

The critical observer will note in both these buildings that setbacks and modified corners are used to enforce another element of the design, which is a direct appeal to sentiment and understanding on the part of the beholder. Horizontality and verticality are introduced into the structures in such manner that each may make its own appeal to the emotions and be held in restraint by the other only when it tends to step beyond the bounds of the larger unity which is determined upon in advance and which it is sought in every way to preserve. In the latter instance there was a study of college life and environment and a knowledge of the college constituency which gave the designer a clue to his larger masses and lesser details and permitted him through the medium of form and color to make an appeal which should find response in the mind and heart of the beholder, for both mind and heart were appealed to and not in vain.

Every work of art, every building into which the designer has put vital feeling, will produce a definite psychological reaction in a sensate beholder — and just about in the same ratio in which the designer has expended himself. It goes without saying that the designer and the beholder must have had community of background and experience that the reaction may be commensurate with the action; that there must have been on the part of both sender and recipient of the message some similar knowledge of the past, some appreciation of the reaction of the race to physical and spiritual environment, of reaction to atmospheric, geographic, climatic and geologic surroundings—to social, political and religious conditions. And this community of apprehension and appreciation should extend to and embrace modern categories and conditions, and include a community of idealism. The potentialities of feeling and expression within us have been implanted by the age-long contact of our ancestry with these conditions, physical and spiritual, and it is for us to release them in unstinted creative and appreciative effort.

What has this to do with setback walls and tower office building? It has this: that some beneficent power, embodied at present in a zoning law, has given architects a chance to create beautiful and appropriate buildings, not Greek temples nor mediæval cathedrals, but something modern, born of a new spirit which is neither Greek or Gothic nor Roman or classic renaissance, but which is intensely of today. There is a chance for the expression of poise, serenity and restraint controlling emotionalism and exuberance of spirit. All are factors of the modern age and all are to be considered and all, at times, in one composition. The tower office building under zoning laws would seem to furnish an opportunity for the latter.

I have discussed the elements of this problem in a book called "The Meaning of Architecture," written from years of experience with materials and men, years of physical and spiritual reaction to circumscribing conditions. I can do no better than to refer to its pages those who subscribe to its main thesis, which is that life is a struggle in which, by overcoming obstacles, character is to be developed in all the perfection of beauty, failing which man falls short of the ideal. Architecture, in the western world at least, is a symbol of this struggle, and a demonstration of perfect final achievement interpreted in terms of structural forces. The content of self-restraint, poise and serenity is to be manifested in the Greek expression of horizontality—not the details but the fact. The content of exuberance of spirit and emotionalism is to find expression in the mediæval concept of verticality—not the details but, again, the fact. We moderns have not the restrained philosophic attitude of mind toward life as had the Greeks, nor the exaggerated emotionalism of mediævalism in the presence of any civil, secular or religious manifestation, but we have in us elements of each which are to be reckoned with.

The problem of the architect in America today is to reconcile and combine these seemingly opposed but very human elements in a composition which shall be appropriate to the time, to the location, and to the conditions. I have suggested, merely suggested, in Figures 21, 22 and 24 in the book referred to, an application under dissimilar conditions and conceived in my mind before zoning commissions had created the issue; conceived because an ideal of appropriateness and beauty seemed to lead that way. A survey of recent buildings in Manhattan erected under the zoning law indicates that idealism as well as the law is pointing the way in some cases.

It were well, in studying the effect of zoning laws upon high buildings, to mark the wide distinction between a certain already existing type of building and that which is being evolved under the impulse of recent enactments. A zoning law, like that in effect in New York, requiring setbacks under certain conditions of environment, tends toward the development of the "tower building" as against the building with a "tower accompaniment" or a tower with a "building accompaniment" of which latter there are two or three striking examples on Manhattan Island, and an extremely crude suggestion of one of these New York structures in Seattle. In Chicago and elsewhere the type leans generally toward the building with the "tower accompaniment." Differing in primary impulse from that which led to the erection of the tower building,—a lofty, unified and quite self-contained composition,—these towers accompanied by buildings or buildings accompanied by towers were not called into existence by economic or social conditions, nor made to relate themselves to their environment by such or by other conditions affecting the well being of the community, but are altogether individualistic expressions, piercing the sky in order solely to attract attention to themselves. In this and other regards the attempt would have been equally successful and the æsthetic effect heightened had the building accompaniment been subdued or eliminated altogether. This could have been done in the case of any tower with "building accompaniment" with perfect feasibility and perhaps æsthetic gain; but an attempt to eliminate either factor, building or tower, in a "tower building" would be as fatal to the structure as to the idea. Tower and building are one, and the one factor is not to be distinguished from the other.

A building is often unified by the presence of the "tower accompaniment," just as a vocal performance is unified by an instrumental accompaniment. Our designers to date, especially those with classic or pseudo-classic proclivities, have been laboring under the delusion that u-n-i-t spells unity and have made their big buildings cubical affairs without charm or interest in general outline—seeking only size and lavish display of ornament to impress. Unity is a social element—a concomitant of civilization and culture, not easily achieved, no more so than civilization itself.

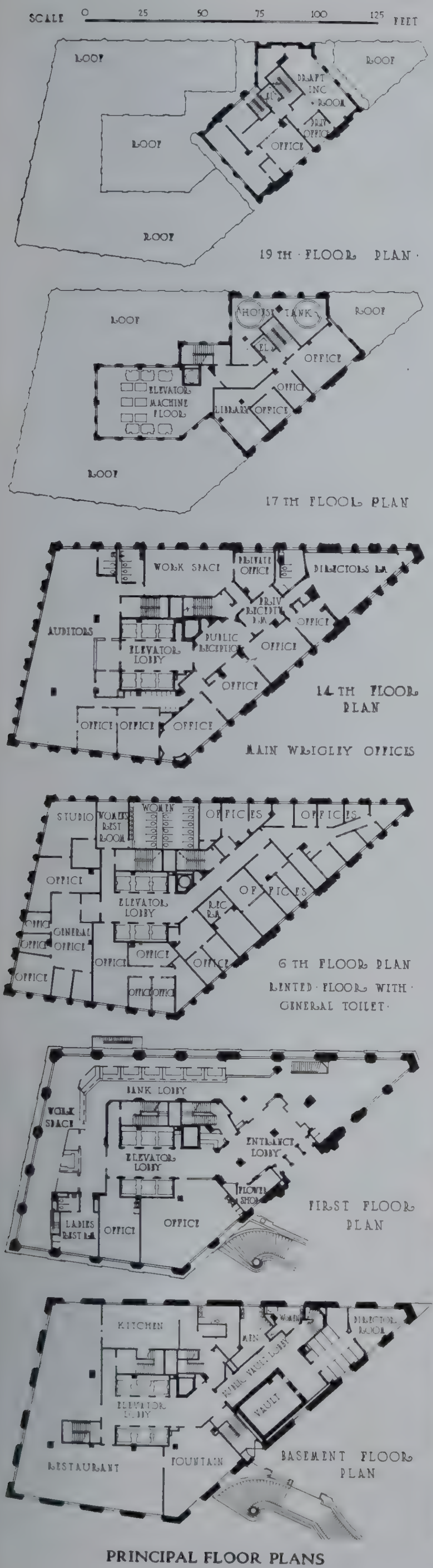
The effects of the units upon unity must be carefully considered in a "tower building." The setbacks may be treated so as to give the effect of a clustered village upon a high plateau, which is fatal to unity and to character. Designers of skyscrapers, in ante-zoning days, to get away from the stupidity and monotony of the cube and to introduce the pyramidal motif, were known to crown their 20- to 30-story office structures with domestic pitched roofs, thus eliminating every vestige of unity and character. The setback would have furnished them a needed relief, had they but known it. The upper stories of the setback building must be brought into harmony,—can only be brought into harmony,—with the whole by a rational and beautiful application of the principles of horizontality and verticality, not either or each alone, but both in harmonious interaction and co-ordination. The one will emphasize the element of repose, the other the element of action. It is for the architect to study the conditions surrounding him and his special problem and give to his structures the full and perfected character they deserve.

Aronson Building
Schwartz & Gross, Architects

Garment Center Buildings
Walter M. Mason, Architect

Younison Building
Geo. & Edw. Blum, Architects

A Group of New York Buildings Designed in Accordance with the Zoning Law

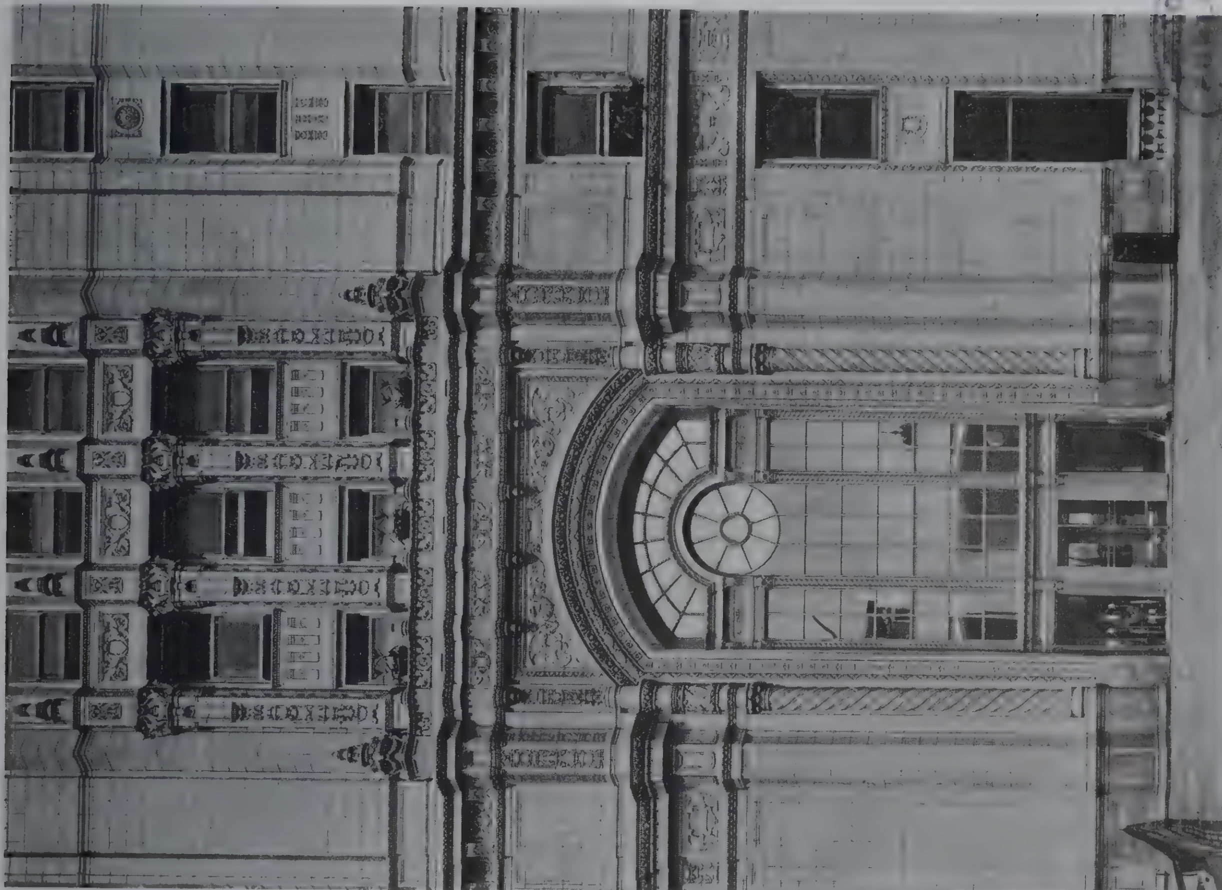


PRINCIPAL FLOOR PLANS

MICHIGAN AVENUE FACADE

WRIGLEY BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST & WHITE, ARCHITECTS



DETAIL OF MAIN ENTRANCE

DETAIL OF LOWER STORIES FROM CHICAGO RIVER

WRIGLEY BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST & WHITE, ARCHITECTS

Architecture and Illumination

A NOTABLE EXAMPLE IN THE WRIGLEY BUILDING, CHICAGO

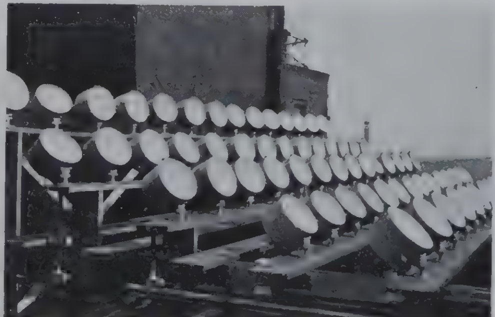
Michigan Avenue Facade of Wrigley Building at Night

THE most notable of the buildings built in Chicago as a result of the extension of the business district and the development of the lake front improvements is undoubtedly that of the Wm. Wrigley, Jr. Co. This structure, with its 34 stories, is placed where Michigan avenue, after crossing the Chicago River, makes a slight turn and the orientation of the building almost upon the axis of the avenue renders it visible at a great distance. The structure, because of its height and striking tower form, would be notable anywhere, but it gains greatly in dignity by reason of its being placed where owing to the bridge plaza upon the east, the river upon the south, and streets upon the west and north, it is effectually separated from adjoining buildings which might challenge its architectural dominance or mastery. Here, secure in comparative isolation, this vast structure of white terra cotta and of ornate design rises to a height of 400 feet.

The architects of the Wrigley building have made an excellent choice of design for a structure which on account of its location will always be of striking importance. The three lower stories above the street level form a base for the building, in the main facade of which is placed the chief entrance which extends through the third floor. At the twentieth story the setbacks develop the tower, which is crowned with a cupola.

Although its appearance at any time is impressive, it is particularly so at night when fully illuminated by a system which is itself unique, and which is said to be the most complete illumination of a single building in the world. The illumination is produced by the use of powerful projectors which flood the structure with a brilliance which is accentuated by the dazzling whiteness of the building itself. The lighting increases in intensity as the building rises until the tower is all aglow. To produce this marvelous illumination requires the use of 198 projectors with 500-watt lamps and 16 projectors with 250-watt lamps, thus making the total current consumption 103,000 watts, requiring about 80 horse power. The approximate candle power cast upon the building from all these units is somewhat more than 25,000,000; the cost of installing the illumination will approximate $30,000, and the cost of operating it each night, including maintenance, lamp renewals and washing the building as often as is necessary, will be about $80. Certainly it is for the Wm. Wrigley, Jr. Co. the most striking possible form of advertising, indelibly impressing upon the minds of tens of thousands of people daily the Wrigley Chewing Gum product.

At left is a plan showing location of Wrigley Building and position of tower so that it is visible from South Michigan Avenue. Below is a group of projectors



Housing in England

THE FAILURE OF THE GOVERNMENT'S POST-WAR HOUSING ENTERPRISE

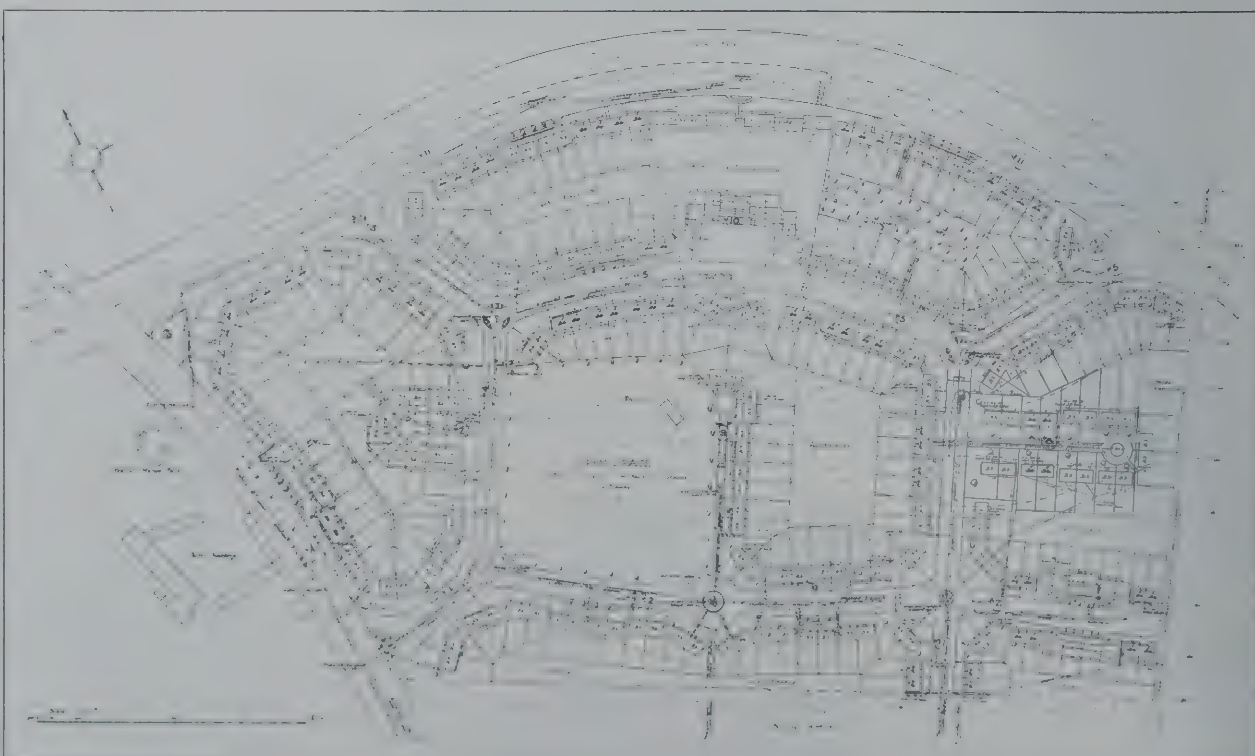
By H. J. BIRNSTINGL, A.R.I.B.A.

THE government's great housing scheme has utterly collapsed. A stupendous opportunity for social reform, for improving the housing conditions of the nation, has been wasted, owing partly to mismanagement and partly to a combination of circumstances brought about by unforeseen events. Yet now, in the midst of terrible wreckage, it is possible to see that when the debris has been removed—at enormous cost to the country—something of value will remain, and by those who are yet grappling with the great problem certain lessons are to be learned. It may therefore be of interest to trace the career of the "Government's Housing Program," which figured so conspicuously in the first post-war election in 1918, promising so much.

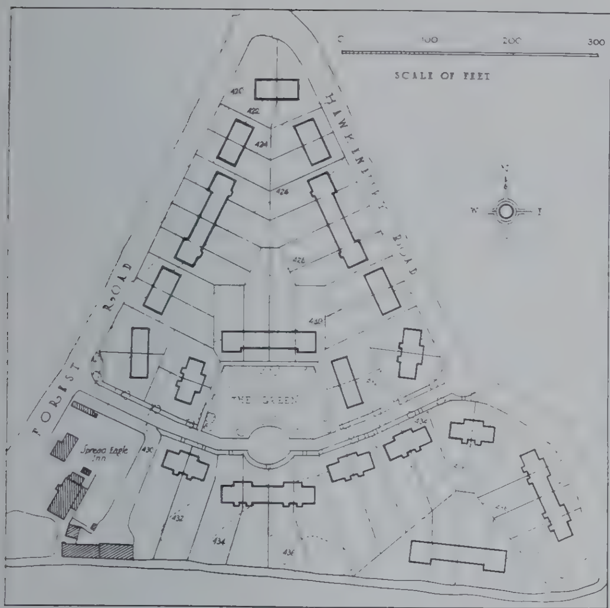
Already, in July, 1917, a committee was appointed by the President of the Local Government Board "to consider questions of building construction in connection with the provision of dwellings for the working classes in England and Wales and report upon methods of securing economy and dispatch in the provision of such dwellings." A very thorough investigation was made by this committee and a lengthy report was published in October, 1918. In July, 1919 the Housing and Town Planning Act was passed and most of the recommendations made by this committee, whose members included such well known architects as Sir Aston Webb and Raymond Unwin, were embodied in the Act or in the regulations arising therefrom.

This Act made it incumbent upon the local authorities of boroughs and of urban and rural districts to undertake a detailed survey of the housing needs of their districts in connection with providing new houses, the reclaiming of slum areas, and the demolition of unfit houses, and in preparing a program for the three years terminating on July 30, 1922. Realizing the impossibility of providing houses on an economic basis, the government offered considerable financial assistance in building. However great might be the loss incurred by a local authority in providing the necessary houses, the financial liability of the authority would not exceed a greater amount than is produced by a penny rate in the pound. The remaining deficit was to be met by the national exchequer.

As the government was virtually financing the scheme, all the undertakings of the local authorities had to receive its approval. When sites were selected they were inspected by government officials; their prices had also to be approved. The



Layout for Housing Scheme at Folkestone, Showing Typical Treatment
A. E. Nichols, Engineer



Plot Plan of Royal Tunbridge Wells
Cecil Burns, Architect

layouts and house plans were then submitted for approval, and finally, before a local authority could enter into a contract for the erection of houses or the construction of roads or sewers, it was necessary that the bids and the terms of the contracts be approved. In order to carry out this work, and generally to assist the authorities in their task, 12 offices were opened by the Ministry of Health—the department responsible for housing—in different parts of England and Wales, each under the supervision of a "Housing Commissioner," who was assisted by a technical staff of inspectors, surveyors and architects. Likewise, at headquarters a staff of experts was engaged which included such men as Raymond Unwin and Michael Bunney. Most of the men comprising these staffs were young and zealous and had seen service in the war; they were, moreover, full of enthusiasm for the work and for the high ideals and standards which the Ministry of Health, under Dr. Addison, maintained.

In order further to assist the local authorities, various manuals were issued for their guidance; these dealt with plans of houses, details of roads, methods of redeeming slums and of converting large houses into flats, and army huts into temporary houses. Moreover, a fortnightly periodical called *Housing* was published by the Ministry, which contained the latest information and showed the progress that was being made in different parts of the country.

By October, 1919 the scheme was fairly launched, but there were innumerable difficulties to be overcome. Local authorities were suspicious of the government's good faith, and doubted the statement that their liabilities would be limited to a rate of a penny in the pound. The plans which they prepared were often not in conformity with the government's new standards of housing, or they were extravagant in use of road frontage or floor space, and there was a shortage of material and of labor. By dint of hard work on the part of the government officials the first of these difficulties was, for the most part, overcome. The inspectors interviewed the officials of local authorities and attended committee meetings, and the architects often entirely recast the plans which were submitted to them for approval.

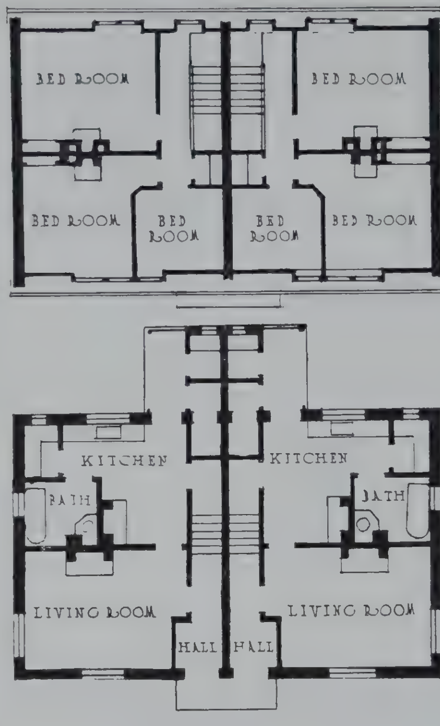
In the early spring of 1920 a veritable campaign was launched by the government to endeavor to persuade authorities to hasten the development of their schemes and avail themselves of the fine building weather of the summer and autumn. As a result of these efforts, the number of houses for which bids were approved, increased during the three months ending March 31 from 16,000 to 85,250. Meanwhile, at the end of 1919 another Act was passed by which any private individual building a dwelling house of a certain size and quality and conforming to certain not very stringent regulations could obtain a grant of money varying from £230 to £260 in accordance with the size and accommodation provided; the floor area of the house was not to be less than 700 square feet or exceed 1400 square feet. This, however, has not proved a successful method of providing houses, for although many have been built, they have often failed to provide accommodations for the class of people whom the Act was designed to

Pair of Brick Cottages at Tunbridge Wells
C. H. Strange, Architect

assist. Thus a rich man could build for himself a week-end cottage, or a lodge for his chauffeur or gardener, and claim a contribution of £260 from the taxpayers, or, to take the other extreme, a jerry builder could erect a shanty of the poorest materials, badly planned, with but the barest necessities, miserably built and of desolating ugliness, and claim state assistance to the extent of £260.

Another method by which the government sought to encourage domestic building was by offering financial assistance to building societies, or Public Utility Societies, as they are called. These schemes required the approval of the Ministry of Health, stage by stage in a manner similar to the working of a local authority's method, but the plan of giving financial assistance differed. A loan might be obtained from the Public Works Loan Commissioners for three-quarters of the cost of the approved scheme, to be repaid over a period not exceeding 50 years by equal semi-annual payments of principal and interest. The societies were furthermore entitled to a subsidy, equivalent to 50 per cent up to 1927 and thereafter 30 per cent of the annual loan charges.

Such then was the condition of affairs during 1920, and by the end of the year the number of houses for which contracts were signed by local authorities or Public Utility Societies was 140,000 and 11,000 houses were completed. Under the terms of the government grants to private persons a further 4500 houses were actually completed and certificates had been issued sanctioning the building of a further 26,500, implying a commitment on the part of the government of £6,500,000. Meanwhile, however, prices were steadily rising, and many of the contracts were let at the top of the market, prices reaching their maximum in about October or November, 1920. By this time the average price of a house containing two sitting rooms and three bedrooms, a kitchen, pantry, bathroom, coal cellar and toilet was about £950 and that of a similar house, containing only one sitting room, about £850, and the Ministry began to be alarmed at these ever growing costs.

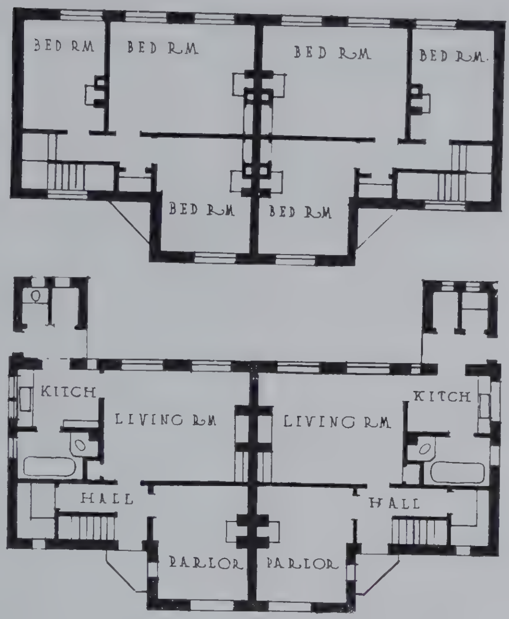


Typical Cottage Plans
Housing at Westhampnett

At the end of 1920, efforts were slackened and scarcely any new contracts were approved. This seemed a wise course, and it was presumed that when prices had fallen, by the spring of 1921, fresh efforts would be made to push forward the great work of providing houses, for the moment was ripe to achieve material results from the preceding two years of work. The enthusiasm of local authorities had at last been aroused; labor, whose earlier failure to cooperate had proved a very serious obstacle, at last seemed willing to increase its output; plans had been prepared for extensive building, and in many cases new roads to accommodate the houses had been built and quantities of materials had been acquired, in fact, the great machine for the provision of houses had at last been started. Yet this was the moment chosen by the government to drop the whole enterprise and to repudiate its pledges to the country to provide houses at any cost for the returned soldiers.

Cottages for the Westhampnett Rural District Council
John Dovaston, Architect

It is not possible—nor



Typical "Parlor" Cottage Plans
Housing at Westhampnett

desirable—to consider the justification of the coal strike which lasted from April until July this year, and disorganized the industry of the country, but there is little doubt that the cost of it so depleted the national resources that it became impossible for the government to enter into any new commitments that might add to its already overwhelming burden of expense. This, coupled with the cry—often utterly unconsidered and indiscriminate—for national economy, which, inspired by a section of the press, swept over the country in the spring and summer of this year, killed the national housing movement. The suddenness and thoroughness of the abandonment may be judged by the fact that on September 30, 9 of the 12 regional housing offices were closed, a technical staff of nearly 900 had been dismissed, effecting a saving in salaries alone of £250,000, and yet the provisions of the 1919 Act were to continue until July 30, 1922.

The course of procedure that has been adopted involves very serious financial losses to the country, for, although actually less money will be spent than if the full program had been completed, much of it will now be spent on the machinery constructed to produce houses but not on the houses themselves. This arises largely from the fact that, on the presumption that the pressing need for 500,000 houses was to be met, provision had already been made for the erection of this number. Thus, by July, 1920, 57,000 acres of land had been acquired for housing purposes, sufficient, at 10 houses to the acre, to accommodate more than the half million, yet the number of houses for which contracts are signed is only 157,500 and this number represents the maximum that will now be built. The surplus land must be re-sold and the legal and other expenses incurred in the transactions of both buying and selling represent a dead loss. Similarly, plans for 280,000 houses have been approved. These must be paid for, but half the houses are not to be built; this again represents a dead loss. Another enormous waste is incurred through the miles of new roads that have been constructed and sewered to accommodate the houses that will now probably never be built. The average cost of street work and sewers is £50 per house. These roads must either be maintained by the local authorities, thus constituting an additional burden on the taxpayers, or they must be allowed to fall into disrepair. There are the materials that have been purchased. When all the houses now contracted for have been built the government will find itself with a surplus of some 400 million bricks, to name but one item, which it will be able to dispose of only at a very serious loss, since the contracts by which the bricks were bought were extremely loosely drawn up, enabling the makers to sell bad bricks at top prices; moreover, these huge stocks are now so congesting the makers' yards that damages are being claimed for storage. Finally, the government is so anxious not to spend more money on houses, that it is actually paying builders, to whom contracts have been let, sums *not to build* houses. At Richmond a sum of £40 per house is being paid to a builder as an inducement not to complete


Pair of Cottages for Westhampnett Rural District
John Dovaston, Architect

his contract. The overhead charges of the government administration were computed some months ago at £2 10s per house. This figure will now be greatly exceeded.

These facts represent the debit side of the enterprise, but fortunately it has a credit side, which shows itself, for the most part, in a less material way. Out of a need of 500,000 houses, about 160,000 will actually have been built; a small percentage, but nevertheless these figures represent the largest contribution that any government has made towards the solution of one of the acutest post-war problems. But there are even more far-reaching results. The whole standard of working class housing has been raised. There is scarcely a parish in the country that is not now familiar with improved methods of estate development, with the necessity of avoiding overcrowding, of giving due consideration to such matters as appearance, proper ventilation, of planning houses with a view to minimizing the work required for their upkeep, and of providing baths and other conveniences. These are lessons that, once learned, will not be forgotten, and there is little doubt that, however the provision of houses is to be effected in the future, estate development will be on the new lines and not on the old, and the long rows of hideous and monotonous terraces, with their filthy back courts and their rear projections shutting out the sun and air, will be things of the past.

The question now naturally arises as to whether the mistakes that were made might have been avoided. The success of the scheme would probably have been assured, despite all obstacles, if it had not been turned into a matter of party politics. In the purchase of materials by the government the most inexcusable blunders were made. Contracts with brickmakers were so full of loopholes that the makers were able to do as they pleased and to postpone supplying the government until prices had reached their maximum; moreover, large quantities of materials were bought that were entirely unsuitable for cottage building, such as large cooking ranges at £14 each. All this could have been avoided by drawing proper contracts, by purchasing the total output of certain brickyards, and by buying only materials which would be of use for the particular class of building concerned.

Seeing the determined efforts that were being made by contractors throughout the country to keep up prices, the government should have given greater encouragement to direct labor schemes and to the Building Guilds. Many municipalities already possessed works departments of which advantage should more often have been taken; they had, moreover, the organization for purchasing materials. Under adequate supervision these staffs and organizations might have been developed for building. Where this course was adopted it usually resulted in cheaper houses.

As this article is being written the Departmental Committee appointed to inquire into the high cost of building has issued its report. It constitutes a strong defense for the attitude of labor, and emphasizes the fact that "houses in great numbers are absolutely essential in the interests of public health and humanity." Who is to provide them? The government is still in a position to fill the interim that must now occur between the time of the abandonment of the moribund public enterprises and the day of the revival of private enterprise, by allowing local authorities to sell this surplus land on specially favorable terms to bona fide constructors of working class dwellings, and by selling stores of materials in the same way. Housing activity must revive, for a vital demand will invariably be met.

Group of Eight Houses for Westhampnett Rural District Council
John Dovaston, Architect

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Power, Light and Heat in Large Buildings

THE SELECTION OF ECONOMIC MACHINERY AND COSTS OF OPERATION

By JAMES A. McHOLLAN

Vice-president of The R. P. Bolton Company, Consulting Engineers

THE expense of operating boiler and engine room machinery in a large building to provide heat, light, power and elevator service is an item which may range as high as 40 per cent of the entire outlay upon the operation of the building. It is therefore a matter of real interest to the architectural profession to be fully informed on the most economical selection of such machinery that can be made, so that not only the initial investment but the operating costs after installation may be kept down to a minimum. The architect is especially interested in economies or innovations effected by those who operate their buildings as such practices have an important bearing on the commercial feasibility of new structures. A large building is primarily a new business enterprise, designed to earn a reasonable return on the capital invested, and if a reduced expenditure upon machinery and a low cost of operation can be assured in advance, some of the difficulties which discourage the investment of money in building operations, especially during periods of high construction costs, will be removed.

One of the most important economies in building operation is the general adoption of purchased electric power and electrically operated machinery in conjunction with the use of low pressure steam. In the economical new building of today, electrically operated machinery is used almost exclusively, such appliances costing less to install, occupying far less floor space and requiring less attention and expense to operate. The heating of buildings and operation of hot water apparatus are, however, unsolved insofar as the substitution of electricity for steam is concerned, and must be by steam. It is generally found that power plant machinery designed to operate in this manner can be installed for about one-third the cost of other systems and is from about 17 to 30 per cent less expensive to operate.

Illustrating the investment required for machinery in boiler and engine rooms these figures will show the reduced cost in three typical new buildings of applying the use of a supply of purchased power in conjunction with low pressure steam supply as compared with the installation of more complex systems:

TYPE OF BUILDING	VOLUME CU. FT.	PLAN I Investment required for high pressure boilers, private electric power plant, piping system and auxiliary machinery arranged to operate with high pressure steam	PLAN II Investment required for heating boilers, piping system in boiler room and electric auxiliary machinery for low pressure plant, electricity being purchased from a public source of supply
Factory	4,000,000	$117,000	$32,000
High class apartment hotel	900,000	$60,000	$15,000
Office and printing bldg.	2,750,000	$163,000	$28,000

These figures are based on prevailing prices, but the same proportional saving in initial investment can be demonstrated in a large structure of any type. These amounts include the cost of only engine and boiler room machinery and do not include the cost of elevators, heating radiators, plumbing and other building equipment, the investment for which is practically the same under both plans.

In view of these wide differences in investment it is of interest to study the comparative costs of operation of the machinery after a building is put into service. Perhaps the most interesting case which has come within the writer's experience is that of a building in which a comparatively new power plant installation, carefully designed and most efficiently operated, was abandoned by the building owners after a few years' use in order to reduce expenses in operation. The cost of converting the equipment so as to make possible the boiler and engine room machinery being operated electrically and the heating service to be supplied on a closed system, amounted to $13,000. A saving of $21,592 was effected so that the entire expense of alteration was saved by the economies secured in nine months' operation. This detailed information will be of interest for purposes of comparison with other structures, existing or proposed:

Type of building	Offices and printing
Volume	2,750,000 cu. ft.
Height	14 stories

Prior to the abandonment of the use of the high pressure steam system the costs of operation were

$90,384 per year, made up of these items:

Coal	$64,345
Labor	20,184
Oil	1,398
Ash removal	1,257
Repairs (to private electric power plant) and supplies	3,200
Total per year	$90,384

This operating expense provided these various services:

I Building service	II Methods of operation or production
Electric light and power	Supplied from the electric power plant operated by high pressure steam
House water pumping	High pressure steam pumps
Fire protection, water and air under pressure for sprinkler system	High pressure steam pumps and compressors
Building heating	Exhaust steam from electric power plant
Hot water supply	Exhaust steam from electric power plant
Industrial steam for stereotype and other purposes	High pressure steam from main boilers

Upon the installation being changed and the machinery operated with purchased electricity the arrangement of the equipment was such as is shown in the accompanying Diagram I, from which is gathered a striking illustration of the reduced number of appliances required to be maintained and used. The actual expenses of operation under this rearrangement were:

Coal	$12,000
Labor	4,150
Oil	37
Ash removal	260
Purchased electricity, 1,462,772 kw. hrs.	50,082
Purchased gas	2,263
Total per year	$68,792

Under the revised plan of operation, the building services were provided in this manner:

I Building service	II Method of operation or production
Electric light and power	Purchased from public supply company
House water pumping	Electrically operated automatic control
Fire protection, water and air under pressure for sprinkler system	Electrically operated automatic control
Building heating	Low pressure steam
Hot water supply	Gas-fired boiler with automatic control
Industrial steam for stereotype and other purposes	Gas-fired boiler with automatic feed and pressure regulation

This is only one example of an economic development such as is taking place over the entire country. The rising expenses of operation are making obsolete many installations which were at one time considered the most perfect of their class. Many buildings have already been changed to operate electrically, the general experience being that the cost of the change is saved within a maximum period of two years. The engineers of a large public utility corporation, owners of many real estate properties, whose operations extend over the entire country, have checked up the wastages chargeable to the use of complex engine room systems and are now proceeding to follow the example of other real estate operators in adopting the newer and simpler methods.

Large hotels are commonly supposed to be dependent upon the use of high pressure steam to a greater degree than any other type of large building, yet a modern hotel can be designed so that only a few minor pieces of apparatus have to be operated with high pressure steam, the largest of which, curiously enough, is the mangle of the hotel laundry. A small automatic gas-fired boiler is provided for this purpose—compact, self contained, automatic and economical in its operation—placed beside the mangle which it supplies. For all other hotel service, electricity, low pressure steam and gas provide economical and simple operation. The architect or engineer of today who plans installations to operate with high pressure steam for even the largest hotel is diverting his clients' funds to purposes for which no operating benefit, either practical or economic, can be secured. A hotel is run on a narrower margin of profit than the majority of business enterprises and every item of investment should be restricted to that which will directly earn revenue for the owner or operator or which is absolutely necessary to complete the physical structure of the building. It may be of interest to know that a well known chain system of hotels in New York, noted for its careful and scientific methods of management, has just recently reorganized the power plants in the properties in its system so that only low pressure steam and purchased electricity are used.

New buildings designed to operate with low pressure steam and purchased electricity show substantial advantages in the use of coal and power as compared with older types of similar buildings in which a larger investment has been made for machinery and in which a higher expense is required per year for the same kind of building service. To illustrate this point, the comparison is made of two large buildings, one of which is equipped to operate with high pressure steam apparatus and the other for operation with low pressure steam and purchased electricity:

	Office building, equipped with high pressure steam and electric power plant	Office building, equipped for purchased electricity and low pressure steam operation
Volume	3,200,000 cu. ft.	6,500,000 cu. ft.
Total steam used per year	78,400,000 lbs.	25,200,000 lbs.
Total electricity used per year	*700,000 kw. hrs.	950,000 kw. hrs.

*Higher consumption of electricity than is usually found in a building of this size is due to design, long interior corridors, small windows, etc.

This following tabulation shows the different methods by which the building service was provided in these two structures:

Building service	Office building, equipped with high pressure steam and electric power plant	Office building, equipped for purchased electricity and low pressure steam operation
Electric light and power	High pressure steam	Purchased electricity
House heating	Exhaust steam	Low pressure steam
Water heating	Exhaust steam	Low pressure steam
Elevator service	High pressure steam	Purchased electricity
Water pumping	High pressure steam	Purchased electricity
Auxiliary pump operation	High pressure steam	Purchased electricity

It must not be assumed, however, that in existing buildings equipped with high pressure steam installations similar economies can be obtained merely by shutting down the engines and generators of a private power plant and replacing their operation with a supply of purchased electricity. While substantial economies may result from this procedure, it is essential in every building, new or existing, where electric light and power are to be purchased, that every piece of steam-operated machinery be rearranged to operate electrically if the full measure of economy is to be realized. The entire system of steam-piping, traps, tanks, heaters, etc., must also be rearranged so as to secure the maximum economy in operation in conjunction with a purchased supply of electric power. These figures of cost show the actual experience of the owner of a factory building who merely shut down his private electric power plant and purchased electricity, but did not convert the other steam-using appliances for economic results under the changed system. The building in question was five stories high, having a volume of 800,000 cubic feet.

Under the system of high pressure steam supply and with the private power plant in operation, the annual costs were:

Fuel, 2320 tons	$18,972
Labor, 4 men	6,900
Ash removal	1,392
Repairs (average) and supplies	1,000
Electricity purchased (breakdown service)	960
Water chargeable to electric plant	250
Insurance	140
Total	$29,614

Upon shutting down the private power plant and purchasing electricity, but making no other changes on the equipment or operating methods, the annual costs of operation were:

Fuel, 2000 tons	$16,200
Labor, 3 men and 1 man for 6 mos.	6,290
Ash removal	1,200
Repairs (average) and supplies	300
Water chargeable to steam plant	180
Insurance	125
Electricity purchased, 270,000 kw. hrs.	12,760
Total	$37,055

The machinery was then rearranged so that all the steam-operated pumps and other appliances were operated electrically, except building heating, hot water apparatus and industrial steam for tenants' use. The latter service was furnished from a new auxiliary vertical steam boiler, with a separate steam piping system specially installed for the purpose. All unnecessary usages of steam were thus eliminated, and under these conditions the costs of operation were:

Fuel, 1100 tons	$8,900
Labor, 2 men and 1 man for 6 mos.	3,500
Ash removal	660
Repairs (average) and supplies	100
Insurance	75
Electricity purchased, 280,000 kw. hrs.	13,140
Total	$26,375

These figures show the effect of a correct operating system in reducing expenses of operation and at the same time explain why so much controversy has centered around the question of central station *versus* private power plant operation. The full

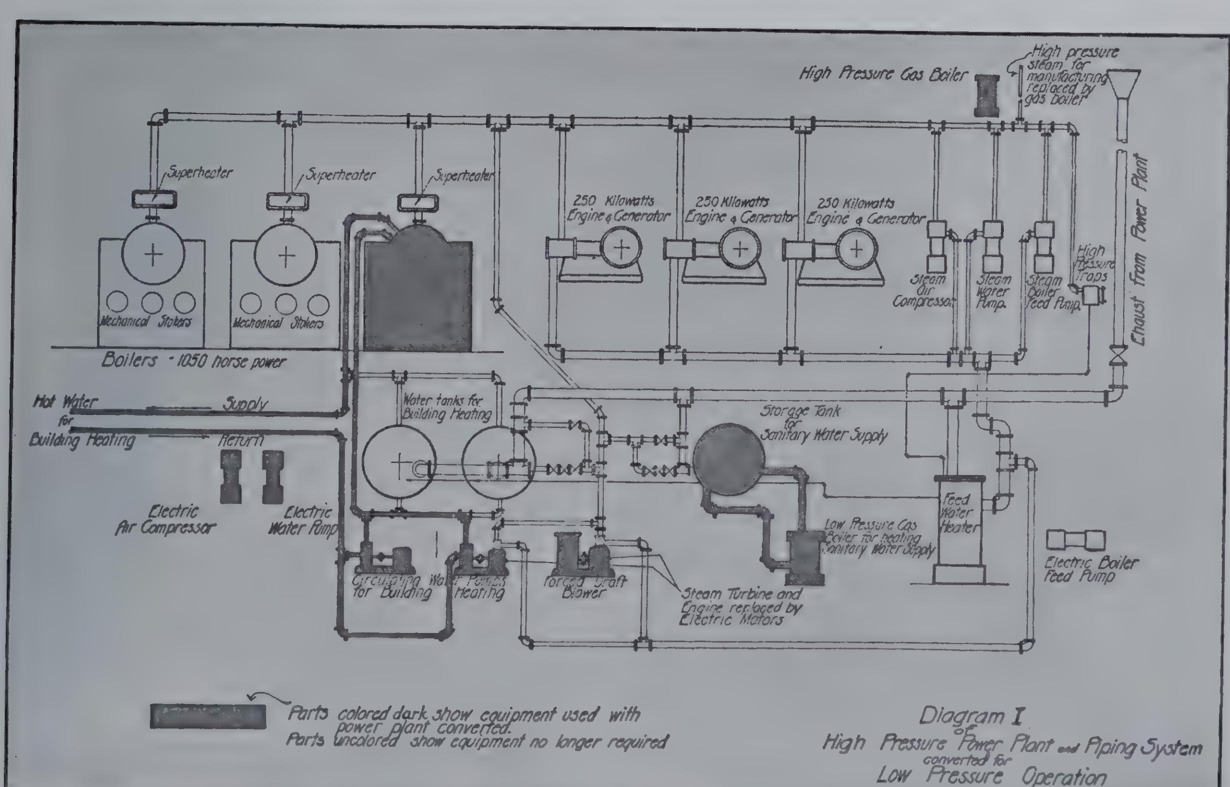


Diagram I. Comparison of Independent Power Plant with Equipment Required when Purchased Current Is Used

measure of economy in operation with purchased electricity, in large buildings, can be obtained only when all power machinery is arranged to operate electrically. Steam should be used only for warming, cooking or other similar processes. If this plan is followed the result is a simple arrangement of machinery, obtained at low cost and inexpensive in operation.

Another development in the financial success of buildings, which is of interest to architects and engineers, is the sub-metering of electricity by which the tenants in office buildings, apartment houses and lofts are charged for electricity in exact ratio to the amount used. It was at one time a general practice of real estate operators to supply free electricity to tenants. This resulted in excessive use and waste of power and light. It is an axiom in building operation that a service gratuitously afforded is seldom appreciated and is frequently wasted. This condition became aggravated as electrical devices for the apartment and office increased in number, and a general policy came into effect, first in loft buildings, then in apartment houses and now being generally extended to the largest office buildings, of metering the electricity used by each tenant and charging for the amount used at the same price which would be charged if the tenant had purchased direct from the public supply company. By applying this system the owner can purchase a total supply current for the entire building at wholesale rates and re-sell to his tenants at the regular retail rates. The building thus bears only the expense of lighting public space, of power for elevators and for minor pumping service. In many buildings this system returns a profit to the owner, due to the difference between the wholesale and retail rates for electricity. In loft and manufacturing buildings the margin from this source usually meets the expense of the lighting of halls and stairways and power for elevator service. This system of sub-metering electric current is of special interest to architects in its effect on the financial success of a proposed new structure, as every reduction in the expenditure which falls on the owner makes it easier to justify an investment in building operation.

Allowances must be made for the cost of providing and installing the electric meters in the offices, stores or apartments. The complete cost with wiring loops, meter boards, cutouts, etc., for the usual building is about $40 each. Under this system the cost of power in loft buildings and of light in office and apartment buildings may be disregarded by the architect who has to consider only that used for public lighting and that required to operate elevators and water pumps.

Another development in machinery design which has an important effect in the operating expense of apartment houses is the modern unit type of refrigerating plant. In an apartment house of the highest class it is customary to furnish refrigeration service to each apartment, and until recent years the usual method was to provide a refrigerating plant in the basement, consisting of a steam engine or motor, refrigerating compressor, brine pumps, circulating water pumps and auxiliary apparatus of sufficient capacity for the requirements of the entire building. Cold brine to cool the boxes was circulated through a piping system.

The development of the so-called unit refrigerator, each machine complete in itself and placed in the apartment to be served, does away with the expensive installation of brine piping, the life of which is always limited. In many buildings such systems of piping have failed, through corrosion, in less than six years after installation and replacement has been found impracticable, due to difficulties and expense in redecorating. The cost of these self-contained unit machines is approximately $1,000 per unit, installed complete, so that in a high class apartment house with 18 apartments the investment is about $18,000, which is no more than a central plant with piping would involve. The expense of operation is of course borne by the tenant instead of by the building owner, as even in the highest class of apartment buildings it is now the general practice for the tenant to pay for all electricity used in his own service. In a building of 18 apartments the cost of operating a central refrigerating plant was about $2,500 per year, but when it was equipped with the unit refrigerators in each apartment, the owner's expenses were reduced to $540 per year.

Coal Usage in Buildings on Low Pressure

Coal usage in buildings equipped for operation with low pressure steam and purchased electricity varies in proportion to the volume. Unusual exposures or corner buildings may show somewhat higher rates of usage in fuel, but the difference due to such conditions is not so great but that the quantities given here may be safely used, as the figures are from actual records from buildings in operation:

Type of building	Volume	Coal used; net tons	Coal used; net tons per 1,000,000 cu. ft. of volume
Office	6,500,000	1796	277
Office	2,032,000	960	†480
Office	18,500,000	5199	280
Office	910,000	350	390
Printing	2,750,000	1000	320
Manufacturing	1,500,000	480	320
*Hotel	1,500,000	1200	*800
Institution	11,225,000	4293	370

†Tower building
*Also includes steam for hotel kitchen and hot water supply

Architects are now devoting greater attention to the question of expense in the operation of their buildings, and the foregoing information may therefore be of interest not only from the viewpoint of costs and quantities of heat, light and power, but also for the information on operating policies favored by those charged with the operation of large buildings. Special acknowledgment is due by the writer to A. R. Heath, Vice-president of the New York Service Company, with whom he has been associated in gathering the information here presented.

Steel Design for Buildings

PART III. THE DESIGN OF A PLATE GIRDER (CONTINUED)

By CHARLES L. SHEDD, C.E.

IN the preceding installment, owing to restricted space, only one table for allowable flange stresses was given. This was Table V, for two 6 x 6 angles with 13″ cover plates. There are given here two others, one, Table VI, for 6 x 6 angles and a 14″ cover plate and the other, Table VII, for 6 x 4 angles and a 9″ cover plate. The 14″ cover plates are a little more economical for heavy girders than narrower plates and if the top flange is unsupported laterally for some distance it is stiffer to resist buckling sidewise.

The narrower plates are especially good for double girders where the width is limited. Two girders side by side with 9-inch cover plates make a very good section to carry a plate and angle column with a 10-inch web, when the web of the column is perpendicular to the webs of the girders. The columns carrying such a pair of girders can readily be made facing the same way as the column carried, so that the webs of the girders may pass directly by the flange plates of the columns and be riveted directly to them with only a small seat angle for erection purposes. This makes a very rigid connection and one that can be easily erected. The different widths of flange plates for the girders may be used to suit various conditions which may be encountered.

As there is but one gage line in the 4-inch legs and two in the 6-inch legs, the sections are so designed that the area of the plates does not exceed the area of the angles in order that when the rivet pitch is figured between the flange angles and the webs, the rivets between the flange plates and angles will be sufficiently strong if spaced opposite those in the inside gage lines of the angles.

Table VIII corresponds to Table IV, showing the distance from the back of the angles to the center of gravity of the flanges.

When this distance is plus, the center gravity is in the angles, but when it is minus it is located in the plates. Some designers specify that no section shall be used where this distance is a negative quantity. Occasionally, when the shear is too great on a short shallow girder, ⅞-inch rivets have to be employed, when a new but similar set of design tables will have to be used.

On light work smaller angles are used and in cases of emergency, when rolled beams were hard to obtain, plate girders have been substituted for beams as small at least as 20″ Is. In designing these very shallow girders it is best to use an exact method in designing the section, that is to compute the sectional modulus of the section to be used.

To determine the rivet pitch on these shallow girders the amount of longitudinal shear per lineal inch should be obtained from the value of SQ/I, where S is the total shear on the girder, Q the statical moment of the flange about the neutral axis of the girder, and I the moment of inertia of the entire girder section.

When no flange section can be found strong enough to resist the bending moment on the girder, the strength of the flange may be increased by introducing some plates 9″ wide under the flange angles. This allows the use of an extra row of flange rivets through these plates and the web inside the rows through the flange angles. In computing the rivet pitch for such a section care should be taken to realize that this new row of rivets does not help to develop any flange stress except in these new plates. It is therefore necessary to compute the rivet pitch twice, once for the planes of shear between the web and these plates and once between these plates and the flange angles.

ALLOWABLE FLANGE STRESSES

2-6″x6″ Ls	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″	3/4″	13/16″	7/8″
Gross A	8 72	10 12	11 50	12 86	14 22	15 56	16.88	18.18	19 46
Net A	8 06	9.36	10.62	11 88	13 12	14 36	15 56	16.76	17 92
do 2h	7.40	8.58	9 74	10 90	12.04	13 16	14.26	15.34	16.40
Flg St No. Pls	129,0	149,8	170,0	190,0	210,0	229,8	249,0	268,2	286,8
14″x 5/16	179.6	198.4	217,0	235.6	253,8	271,8	289,4	306,6	323,6
3/8	191,9	210.7	229.3	247,9	266,1	284,1	301,7	318,9	335,9
7/16	204.1	222,9	241,5	260,1	278,3	296,3	313,9	331,1	348.1
1/2	216,4	235,2	253,8	272.4	290.6	308,6	326,2	343,4	360,4
9/16	228,6	247,4	266,0	284,6	302,8	320,8	338,4	355,6	372,6
5/8	240,9	259,7	278,3	296,9	315,1	333,1	350,7	367,9	384,9
11/16	253,1	271,9	290,5	309,1	327,3	345,3	362,9	380,1	397,1
3/4	265,4	284,2	302,8	321,4	339,6	357,6	375,2	392,4	409,4
13/16	277,6	296,4	315,0	333,6	351,8	369,8	387,4	404,6	421,6
7/8	289,9	308,7	327,3	345,9	364,1	382,1	399,7	416,9	433 9
15/16	302,1	320,9	339,5	358,1	376,3	394,3	411,9	429,1	446,1
1	314.4	333,2	351,8	370,4	388,6	406,6	424,2	441,4	458,4
1 1/16	326,6	345,4	369,0	382,6	400,8	418,8	436,4	453,6	470,6
1 1/8	338,9	357,7	376,3	394,9	413,1	431,1	448,7	465,9	482 9
1 3/16	351,1	369,9	388,5	407,1	425,3	443,3	460,9	478,1	495,1
1 1/4	363.4	382,2	400,8	419,4	437,6	455,6	473,2	490,4	507,4
1 5/16	375,6	394,4	413,0	431,6	449,8	467,8	485,4	502,6	519,6
1 3/8	387,9	406,7	425,3	443,9	462,1	480,1	497,7	514,9	531,9
1 7/16	400,1	418,9	437,5	456,1	474,3	492,3	509,9	527,1	544,1
1 1/2	412,4	431,2	449,8	468,4	486,6	504,6	522,2	539,4	556,4
1 9/16	424.6	443,4	462,0	480,6	498,8	516,8	534,4	551,6	568,6
1 5/8	436,9	455,7	474.3	492,9	511,1	529,1	546,7	563,9	580,9
1 11/16	449,1	467,9	486,5	505,1	523,3	541,3	558,9	576,1	593,1
1 3/4	461,4	480,2	498,8	517,4	535,6	553,6	571,2	588,4	605,4
1 13/16	473.6	492,4	511,0	529,6	547,8	565,8	583,4	600,6	617,6
1 7/3	485,9	504,7	523,3	541,9	560,1	578,1	595,7	612,9	629,9
1 15/16	498,1	516,9	535,5	554,1	572,3	590,3	607,9	625,1	642,1
2	510,4	529,2	547,8	566,4	584,6	602,6	620,2	637,4	654,4
2 1/16	522,6	541,4	560,0	578,6	596,8	614,8	632,4	649,6	666,6
2 1/8	534,9	553,7	572,3	590,9	609,1	627,1	644,7	661,9	678,9
2 3/16	547,1	565,9	584,5	603,1	621,3	639,3	656,9	674,1	691,1
2 1/4	559,4	578,2	596,8	615,4	633,6	651,6	669,2	686,4	703,4

Table VI

It is occasionally necessary to splice the webs or flanges where the girders are very long. Where only one splice is required in the web it may be placed near the middle of the girder or, in other words, near the point of zero shear where the web is doing the least work. These web splices are made in varying forms, depending upon the taste of the designer. Two common types were shown in Fig. 10 of the article appearing in the June number of THE FORUM. The "a" type is preferred by the author as it allows a simpler and more exact analysis to be made. Two origins of stress must be considered in making this design, that is the stress from the shear on the girder and the stress from the bending. The rivets on each side of the joint in the web must be capable of resisting these stresses. The shear must be considered as being transferred from the web to the splice plates at the center of gravity of each group of rivets. This causes a moment on the group equal to the shear multiplied by half the distance between these centers of gravity, and this moment should be added to the moment on the girder resisted by the web and the rivets designed to resist the resultant of the stresses caused by this moment and the vertical shear.

The stresses caused by the moments are proportional to the distances of the rivets from the center of gravity of the group and the moments are therefore proportional to the squares of the distances. If a summation were made of the squares of the distances of each rivet from the center of gravity of the group, and the moment divided by this summation (care being taken to use inches in the summation of the squares and inch-pounds for the bending moment), the result would be the stress on an imaginary rivet one inch from the center of gravity of the group, and if this were multiplied by the distance to the rivet the most distant from the center of gravity, the result would be the stress on that rivet due to the moments. This stress would act in a direction at right angles to a line connecting the rivet with the center of gravity, and if this were shown diagrammatically it could be combined with the vertical stress found by dividing the shear by the total number of rivets in a group and the resultant would be the stress on the most strained rivet. The value of the rivet to resist this strain would be the same as that of one of the flange rivets. Tables can be made showing the sum of the squares of various groups of rivets, which will aid materially in designing a splice, but in any event two or three trials are usually necessary before the required design can be obtained.

In designing a flange splice the operation is much simpler as only the direct tension or compression has to be considered. It is not practical to have the angles or plates in the compression flange bear against each other to transfer any part of the stress. The only care necessary is to have the centers of gravity of the spliced material, of the splicing material, and of the rivets as nearly coincident as possible.

In girders used in shops to carry crane girders or in any place where the girder is liable to lateral stress, the top flange can be strengthened to resist such a stress by adding a channel placed with its web flat and its flanges turned down. Such a channel may be replaced by a wider plate than the ordinary flange plates, having additional angles at its outer edge with their vertical legs turned down to make a section similar to a channel with its web flat. The maximum stress in such a girder is at the outer edge of this channel shape and is the sum of the stresses caused by the bending in the two directions. The mistake is often made of using the resultant of these two stresses instead of the sum.

ALLOWABLE FLANGE STRESSES

2-6x4 Ls	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"
Gross A	7 22	8.36	9.50	10.62	11 72	12 80	13 88	14 94	15.96
Net A	6,56	7 60	8.62	9.64	10.62	11.60	12 56	13.52	14 42
do 2h	5 90	6.82	7 74	8.66	9.54	10.40	11 26	12 10	12 90
Flg St No Pls	105,0	121,6	138,0	154,2	170,0	185,6	201,0	216,4	230,8
9x 5/16"	130,6	145,4	160,0	174,8	188,8	202,6	216,4	229,8	242,6
3/8"	137,9	152,7	167,3	182,1	196,1	209,9	223,7	237,1	249,9
7/16"	145,1	159,9	174,5	189,3	203,3	217,1	230,9	244,3	257,1
1/2	152,4	167,2	181,8	196,6	210,6	224,4	238,2	251,6	264,4
9/16	159,6	174,4	189,0	203,8	217,8	231,6	245,4	258,8	271,6
5/8	166,9	181,7	196,3	211,1	225,1	238,9	252,7	266,1	278,9
11/16	174,1	188,9	203,5	218,3	232,3	246,1	259,9	273,3	286,1
3/4	181,4	196,2	210,8	225,6	239,6	253,4	267,2	280,6	293,4
13/16	188,6	203,4	218,0	232,8	246,8	260,6	274,4	287,8	300,6
7/8		210,7	225,3	240,1	254,1	267,9	281,7	295,1	307,9
15/16		217,9	232,5	247,3	261,3	275,1	288,9	302,3	315,1
1			239,8	254,6	268,6	282,4	296,2	309,6	322,4
1 1/16			247,0	261,8	275,8	289,6	303,4	316,8	329,6
1 1/8				269,1	283,1	296,9	310,7	324,1	336,9
1 3/16				276,3	290,3	304,1	317,9	331,3	344,1
1 1/4					297,6	311,4	325,2	338,6	351,4
1 5/16					304,8	318,6	332,4	345,8	358,6
1 3/8						325,9	339,7	353,1	365,9
1 7/16						333,1	346,9	360,3	373,1
1 1/2							354,2	367,6	380,4
1 9/16								374,8	387,6
1 5/8								382,1	394,9
1 11/16									402,1
1 3/4									409,4

Table VII

BACK OF Ls TO C G FLANGE (INCHES)

t of Pls			0	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 1/2"	1 5/8"	1 3/4"	1 7/8"	2"	2 1/8"	2 1/4"
6"x6" Ls	14" Pls	3/8	1 64	95	80	.66	54	43	.32	22	.13	.04							
		7/16	1 66	1 02	88	.74	.62	51	40	31	.21	.12	.03						
		1/2	1 68	1 09	95	.82	.70	.59	.48	.39	29	.20	.11	03	-.06	-.14	-.22		
		9/16	1 71	1 15	1.02	.89	77	.66	55	.46	.36	27	.18	.10	.01	-.07	-.15	-24	
		5/8	1 73	1 21	1 08	.95	83	.73	.63	.53	.43	.34	.25	17	08	.00	-.08	-.16	-24
		11/16	1 75	1 26	1.13	1.01	89	79	69	59	49	40	.32	.23	14	.06	-.01	-09	-16
		3/4	1 78	1 31	1 18	1.07	95	85	75	65	.55	46	38	.29	.20	12	05	-.02	-09
		13/16	1 80	1 35	1 23	1.12	1 00	.90	.80	71	61	.52	.44	.35	.26	.18	.11	03	-04
		7/8	1.82	1 39	1 27	1.16	1 05	95	.85	.76	.66	.57	49	.40	.32	.24	16	08	00
6"x4" Ls	9" Pls	3/8	1 94	1 27	1 11	96	82												
		7/16	1 96	1 35	1.20	1.05	93	80											
		1/2	1 99	1.43	1.29	1 15	1.02	90	78										
		9/16	2 01	1.49	1.36	1.22	1.09	98	.87	77									
		5/8	2 03	1 54	1.42	1.29	1 17	1.05	95	.84	.73								
		11/16	2.06	1.59	1.47	1.35	1.23	1.11	1.01	91	.81	.71							
		3/4	2 08	1.64	1 53	1.41	1.29	1.17	1 07	98	88	.78	.68						
		13/16	2 10	1.68	1.57	1.46	1.35	1 23	1 12	1 03	93	84	75	66					
		7/8	2 12	1.72	1.62	1 51	1.40	1.29	1 19	1 08	.99	90	81	72	63				

Table VIII

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Straight Talks with Architects

II. HOW MANY ARCHITECTS WILL BE IN BUSINESS TEN YEARS FROM NOW?

THIS morning we sat in the office of an architect who, for many years, has been a constructive force in his profession. He has long realized the importance of architectural practice as an element in the economic structure of the United States. He also realizes the weaknesses which exist in the profession today and which threaten to undermine its strength and to result in an adverse effect on the business of every member of the profession, regardless of the volume of his practice or its character.

There are some unpleasant facts facing the architectural profession today, and our friend voiced this sentiment when he said in no uncertain terms, "There is only one thing you can do to make architects realize the gravity of the present situation — use scareheads! You cannot make them too strong, because conditions warrant every possible effort to stir architects into a state of mind where they will give consideration to the future welfare of the profession, which today is menaced far beyond their realization."

We have fully realized this situation for many months—in fact since long before the close of the war. We have been at a loss, however, to know how these conditions might best be brought before the architects of the country in a sufficiently strong but inoffensive manner. We have discussed these questions with architects of every type—with conservatives, who have warned us that we are treading on dangerous ground, and with radicals, who have a tendency to agree with any departure from the well worn path of precedent. The test of the matter, however, and a fact which has clarified our course in attempting to "shed light in the dark corners," is the unfailing approval which has met our views in discussing these matters with architects who have made *business successes* of their organizations.

JUDGING by the expressions of public opinion regarding architectural service, which have from time to time reached this office, it is evident that there exists today a paradoxical condition. The public condemns the average architect as inefficient from a business viewpoint. The general impression exists that the employment of an architect is in many instances almost a luxury. On the other hand, as is universally understood, the public entrusts the architectural profession with the expenditure of vast sums of money for construction.

Unfortunately, the public does not understand the complexity and volume of the work involved in carrying out an architectural commission. In days of old, when the architect functioned principally in the field, his service was obvious—he was a master craftsman, directing the work of the representatives of the several guilds or crafts which were involved in the construction of an artistically designed building. Today, he is the master builder, but much of his service is carried on behind the closed doors of his drafting room, and of all he produces, the average layman can understand only the perspective and sketch floor plans. In the public consideration of a finished building, the architect usually receives credit only for its finished appearance. Approval is rarely bestowed upon him for convenience of arrangement, together with the equipment for the comfort and safety of tenants. In fact, the average person does not realize that architectural service goes far beyond the development of the æsthetic phase of building design.

There is no great profession which receives so little publicity as that of architecture. Newspapers and periodicals dwell on the progress which is made in the medical profession—the exploits and achievements of lawyers constitute first page news. How rarely does one read of the work of an architect in the public press! It is true that monumental buildings receive a certain amount of favorable comment, but it is a rare instance when the name of the architect is mentioned or any credit given to architecture as a professional activity.

There are two kinds of criticism which are useless. The first of these is criticism which is of a destructive nature; the second is criticism of a general nature which offers no solution. In this article we must, therefore, attempt to make our criticism constructive and specific. In the course of articles which are to follow, together with presentation of correspondence regarding the subject, we hope to offer practical solutions. Here, therefore, is a list of the points which we believe express present weaknesses, individual and collective, in the architectural profession today:

1. Lack of full co-operation within the profession to meet business problems which confront the profession as a unit.

2. Failure on the part of individual architects to keep thoroughly abreast of developments affecting their professional and business interests.
3. Unbusinesslike and improperly developed methods of charging for architectural services.
4. Lack of proper business training.
5. Lack of thorough knowledge of practical construction, or field experience.
6. Weakness in cost estimating, particularly in preliminary stages.
7. Unsound business getting methods.
8. Failure to assume a rightful position in community and political activities.
9. Inefficient business administration within the individual organization.

We may now consider these points individually and in some detail:

1. Lack of full co-operation within the profession to meet business problems which confront the profession as a unit

In order that there be no misunderstanding of our position in this matter, may we at once call attention to the fact that this article is not an adverse criticism of the American Institute of Architects? In fact, it may be said that the Institute has functioned perhaps as efficiently as an organization may function when its membership in numbers probably represents only 20 per cent of the practicing architects in this country. The present writing therefore is directed more to the great unorganized mass of architects who, as individuals, are struggling against problems which can only be solved by a strong collective effort.

If we investigate other professions, we find strong organizations functioning in research, publicity and as media for the exchange of advanced knowledge. We find these organizations establishing standard practice wherever possible and representing their members on political and business questions having a direct bearing on their collective business interests.

One of the duties of such an organization among architects is to keep the profession before the public eye in the proper light. It must take proper interest in civic and national problems; it must be the spokesman of its members in the establishment of national or local regulations affecting the profession; it should be actively co-operating with the federal government in the solution of housing and unemployment. It should be strongly represented at every point where standardization of building materials, methods and practice may be under consideration. Such an organization should take the lead in constructive efforts to educate those within its own ranks in proper business practice and professional procedure. Every architect in this country should belong to an organization of this type. At this point we may mention the state societies of architects, some of which are beginning to function strongly on behalf of their members. Of particular interest in this consideration is the work which has been done by the Illinois Society of Architects. We have not the space here to review its work, but we assume that many architects are familiar with it and we know that these activities have been not only beneficial to the direct membership of this organization, but that they provide the proof of what can be done when architects get together seriously to meet their collective problems with definite action.

Why should we hear from east and west, from north and south, complaints of the encroachment of building contractors on the architectural field? Surely, any competition which gives service to the public is worthy competition, and if it be such that it disturbs the architect and makes him feel that others are encroaching on his legitimate field, this can be true only because he is not rendering proper service as demanded by the building public. We may close our consideration of this matter by calling attention to the obvious fact that no professional, industrial, commercial or labor group has ever received proper consideration, public or politic, until organized, co-operative effort has been put forth.

2. Failure on the part of individual architects to keep abreast of developments affecting their professional and business interests

We may preface this discussion with a question. "Why is it that architects collectively *read* less than any other professional group?" Consider for a moment the doctor, the lawyer, the dentist or the engineer. Where we find them, we find readers, particularly of the publications which convey to them the knowledge of progress within their respective professions; news which describes new methods; facts regarding the economic phases of their own businesses, and any other data which may be of help to them, either in getting business or rendering better service to their clients.

It is a fact that the architect keeps fairly well abreast of developments along the line of design because he is a close student of pictures. He is far behind the times, however, in matters of business and of developments within the building construction industry. In fact, the broad statement may be made that in no profession are there so many individuals who stop studying almost at the time when they begin their professional practice! Fortunately, in the average architectural organization, young blood is constantly being introduced. It is this fact alone which keeps many offices at least only four or five years behind the times. In analyzing this matter, we find a new application of the biblical statement that "To him who hath shall be given." We find that the more successful an architectural organization may be, the more closely it has studied every contribution tending toward the advancement of knowledge along lines contributory to the building industry and to modern architectural design. As a matter of fact, the less business an architect has, the more carefully

should he study modern business trends and modern developments in his profession, in order that he may be in a better position to get business and to hold his clients and receive their recommendation for the work which he does.

We may pause here for a moment to quote further comments made by our friend whose statements form the introduction to this article. "You will realize," he said, "that the average architect hates to admit lack of knowledge on any subject, particularly in relation to building construction. In some cases, he thinks he knows it all, and in other cases he wants the client to think so. It is a fact, however, that building construction has become so complex in its nature, that no one man can know as much as should be known in order to carry out all details of designing a large building. In the profession of medicine, all doctors have reached a stage where they admit that the knowledge of specialists should be employed in difficult cases. On the other hand, there are very few architects who will not undertake the design of any kind of a building if they have the opportunity. They hesitate to call in consultants who are specialists in certain phases relative to construction or equipment. They do not realize that in most cases the owner welcomes such advice.

"The result may be seen in every part of the land, in the form of buildings which are inefficient machines to carry out the purposes for which they were conceived. This should not be the case, and every building which represents an element of failure in performance of its main purpose, contributes its quota of disfavor towards the architectural profession in the eyes of the public.

"Is it the fault of the leaders in the profession who will not contribute the knowledge they have gained for the benefit of beginners? Perhaps so—but more certainly it is the fault of the individual architect who assumes more than he can perform and who does not keep abreast of developments and resources which may tend to safeguard the interests of a client!"

3. Unbusinesslike and improperly developed methods of charging for architectural services

This is a subject which we deem of particular importance and which will be considered in detail in the November or December issue of THE ARCHITECTURAL FORUM. It is sufficient now to say that many architects are struggling for a successful solution of this question of charging clients for services. It is true that a certain standard series of minimum charges, based on percentages, has been recommended by the American Institute of Architects. It is not true, however, that these standard charges are always adhered to by architects generally. In fact, we doubt very much if there is any office which has not deviated from the standards set forth in some instances. There has gone abroad through the architectural profession a definite misconception of what we believe to be the position of the A. I. A. in regard to this question. Membership in the Institute is not contingent upon agreeing to the charges of this schedule. We have heard many of the younger architects declare that they would not join the Institute because of this condition. What the Institute has set forth, in its own words, is:

> "Even as a schedule of charges the document is not of a very precise nature. It indicates that the basic percentage under ordinary circumstances is six, but that there are many cases in which it is greater. The percentage necessarily varies under different circumstances, since the architect's fee, like that of any professional man, must depend upon his skill, experience and standing, upon the character and location of the work to be done, as well as upon the kind and cost of the services to be rendered. Therefore, to base the architect's fee upon an unvarying percentage of the cost of the work is neither reasonable nor equitable; but since that method has long been and is still largely in use, the Institute names a certain rate lower than which in ordinary cases competent and complete services are not to be expected."

It is but logical to say that the fee of the architect must depend, even as a doctor's fee depends, upon his established practice, his skill and his experience. There are architects who do no residential work for less than 10 per cent and they get 10 per cent without question, because of the record which they have established. To go to the other end of the scale, we may cite the case of an architect who does work for speculative builders at low cost to them and at high profit to him. Here is an instance. A speculative builder comes to him for the plans and building permit necessary to construct a two-family house. He draws the plans on paper and gets the building permit. He writes no specifications and provides no details. It takes approximately 30 hours of draftsman's time to do this work. On the ordinary schedule of charges, the owner will pay for the plans and specifications and other architectural service between $600 and $800. He pays in this case $150. Out of this, the gross profit to the architect is over $100.

The question thus resolves itself most logically into the evolution of a method of payment by which the architect is reimbursed for the time of his organization, and this time paid for by the owner is used as he may see fit. Here there is introduced the opportunity for differentiating between the skill and experience of one architect as opposed to another. The architect, under a system of this kind, could estimate the value which the market establishes for his services and could contract definitely on this basis without proceeding along unethical or unprofessional lines. Today, if you want the doctor on the corner, you pay him $3 a visit, but if you want a famous specialist you will pay as much as he sees fit to charge. The same condition is true of the legal profession. Why not, then, of the architectural profession?

4. Lack of proper business training

Here is a subject on which volumes could be written. At this time, however, we will take occasion to make only a few comments. To outline another paradox—in the education of an architect as it is carried out today, there seems to be no room for business training. Our architectural schools,

even including the so-called "practical" courses which are presented through such organizations as the Y. M. C. A., do not equip a man to conduct the *business of architecture*—what he learns about business procedure is learned in the "school of hard knocks." A few architects, fortunately, are gifted with what in many instances is slightingly termed "the commercial instinct." But when we realize the vast changes which have taken place in the requirements of building construction, it becomes evident that this "commercial instinct," introduced into an architectural organization, is to be admired.

Naturally, the need for business knowledge varies with the type of practice in the individual office. We may make the direct statement, however, that in almost every instance where a client becomes dissatisfied with the service of an architect, *it is not on the grounds of design*, but is due to failure in some one of the business phases which enter into relations between the architect and his client.

5. *Lack of thorough knowledge of practical construction*

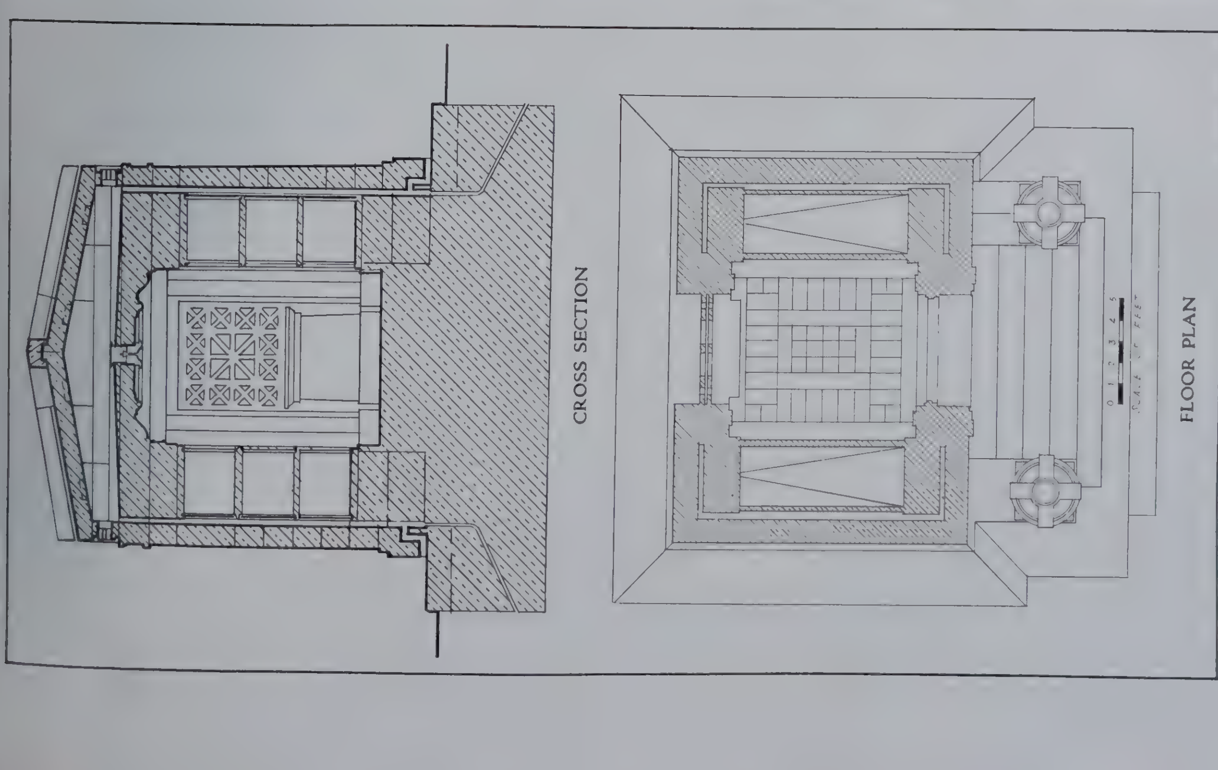
When in the evolution of architectural practice the principal activities retired from the field to the office, the momentum of the change was too great and carried the architect too far from direct contact with actual construction conditions. It is a well known fact that a practical building contractor will take the plans of many architects and make changes which will result in economy, due to the saving of labor and material. We have watched with interest the educational value of field work which has been undertaken by certain younger architects employed by building construction organizations. These men have been called upon not only to design buildings but to carry out construction superintendence or to work as assistants to the superintendents of construction. In this manner they have had a much more intimate contact with actual field conditions than is ordinarily received in the course of architectural supervision. It is an undeniable fact that this experience has made their services as architects of much more value to those who have employed them. They have much more practical methods of cutting corners; they have learned to visualize their work more definitely in terms of quantities of material and hours of labor. They have learned the value of standardization and the important relationship between dimensions and available stock sizes of material. They have actually been very close to work in three dimensions, which to a great extent had before been carried out in their own minds on the flat surface of drawing boards. There is a vast difference between designing a building and supervising its construction, and designing a building and actually building it. This difference is reflected in future planning in many practical ways. We believe that a young architect or a graduate from an architectural school can have no better experience than to work for one or two years for a building construction company. Changed outlook and added knowledge thus afforded will find direct expression through all the rest of the years in which this man may be engaged in planning buildings.

Naturally, it is impossible for the average architect to spend much time in the field, but he has another opportunity to meet this situation, which in most instances does not receive his consideration. If he himself has not a thorough practical knowledge of actual field work, it would be well to call into conference those who have. These may be building contractors or they may be engineers, specializing in some important phase of mechanical or structural design.

Restrictions of time and space forbid an extended consideration of the additional points set forth in the introductory paragraphs of this article. To a certain extent these are self-explanatory. In preceding issues we have discussed the question of preliminary cost estimates and the dissatisfaction which has arisen on the part of owners where building costs have greatly exceeded the architects' original estimates. We have seen numerous sound projects taken out of the market because of the disappointment of the owner in finding the contractors' figures greatly in excess of the architect's estimates and his own limit of investment.

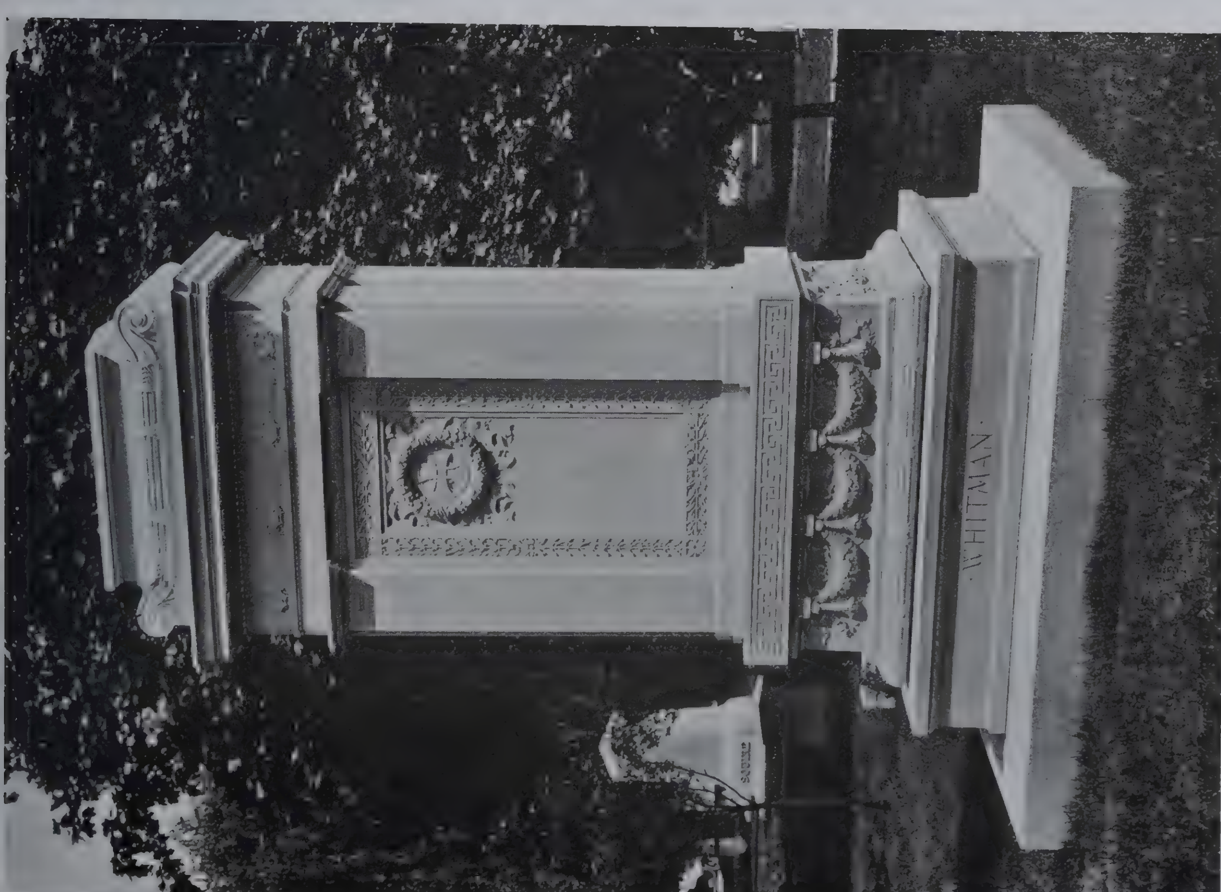
In regard to business getting methods there exists today a great need for constructive work on the part of the average architect. We are no longer in a period when an architect can afford to wait patiently for such work as chance and social contact may bring into his office. Back of this failure to get work on a sound selling basis there is, of course, the factor of inadequate business experience. It is difficult, indeed, for an architect to visualize real estate improvement in the form of building if he has no knowledge of real estate methods or building finance. Similarly, it is difficult for him to enter the field of commercial and industrial building if he has not the faculty of viewing building problems from the viewpoint of the tenant to whom the building is the most important machine in connection with the conduct of his business.

These are but indications of the great fundamental problem which faces the architectural profession today. We are undoubtedly at a parting of the ways in this reconstruction period when architecture as a profession is threatened with the loss of individuality. There is a definite danger that it will be assimilated by new types of building organization, many of which are in evidence today, wherein architectural practice is but a department of a complete service to the owner. On the other hand, by careful, co-ordinated effort, which will come only through individual realization of the situation, it is quite possible that the architect will become in fact the master builder and that his organization will, as never before, be the service organization to which the prospective building investor turns, not only for the best in design but for complete appreciation of his business problems.



SHEDD MAUSOLEUM, LOWELL, MASS.

HARTWELL, RICHARDSON & DRIVER, ARCHITECTS



WHITMAN MEMORIAL, MT. AUBURN CEMETERY, CAMBRIDGE, MASS.

HARTWELL, RICHARDSON & DRIVER, ARCHITECTS

Plate Description

HECKSCHER BUILDING, NEW YORK. PLATES 47–49. This structure, at the southwest corner of Fifth avenue and 57th street and fronting also on 56th street, besides being the largest building yet erected in this immediate locality, is interesting as being designed in the style of the French renaissance, a type rarely selected for a tall business structure, and also as having been planned in conformity with the New York zoning regulations. The lower stories of the building are intended for high class wholesale and retail business while the floors in the tower, being of smaller area, are arranged as offices, the main entrance to the different floors being from Fifth avenue.

An arcade, one story in height, extends through the building from 56th to 57th street, the space upon its sides being arranged as small retail shops suitable for businesses which require but small areas. This is a comparatively unusual application of the arcade idea and is especially successful in making a more intensive use of ground floor space in a building covering a large and extremely valuable area. The arcade has been given an architectural appearance in keeping with the building, with trim of black and gold marble, bronze show window details and painted ceiling.

The designing of the Heckscher Building in accordance with the provisions of the zoning law was simplified by reason of the fact that 57th street, being of unusual width, permitted the same cornice line as Fifth avenue; the southern portion of the structure, however, facing 56th street, was necessarily planned in accordance with the street's narrower width. The exterior of the building is of Indiana limestone up to the main cornice, the walls above, with their various setbacks, being of grayish tan brick made in a special size, 4 x 4 x 11½, while the terra cotta which is used as ornament is the color of limestone. A striking detail of the exterior is the use of metal panels at the floor levels between the windows of different stories. These panels are of copper wrought in high relief and toned to a light, bright green by the use of acids. The panels create strong vertical lines which have the effect of accentuating the height of the building.

FISK BUILDING, NEW YORK. PLATES 50, 51. This structure fronts upon 57th street and the ends face Broadway and Eighth avenue so that the building was planned to embody the setbacks required by the zoning regulations governing these three thoroughfares. Being in the heart of New York's automobile district, it was necessary that the salesrooms upon the ground floor possess ample show window space which has been secured to an unusual degree by covering the structural steel with cast iron about these window areas. Above this main floor the second and third stories are faced with stone to form a base for the remaining 23 floors of brick with their setbacks and parapets. Above the 21st floor, where the uppermost setback occurs, the facade of the tower is designed with a row of pilasters which tend to unify the design and to broaden the apparent width of the facade.

THE LIGGETT BUILDING, NEW YORK. PLATES 52, 53. This structure represents a typical modern New York office building occupying a valuable plot, which necessitates the obtaining of the utmost in rentable area. The building occupies the northeast corner of Madison avenue and 42d street, with an extension, 40 feet in width, facing 43d street.

Complying with the provision of the New York zoning ordinance, the building is planned with setbacks above the height permitted facing avenues or streets of the widths here involved. Up to the sixteenth floor the exterior walls are of red brick in four shades, laid in Flemish bond, with sills of limestone and a cornice at the level of the seventeenth floor. At this point, where the first setback occurs, small towers are placed at the corners. This setback is of two stories and the walls are of the same material, with cornice and trim of limestone. Above this is the main portion of the tower which includes four stories, which are given similar treatment, and above the tower is a penthouse for tanks and elevator machinery, so planned as to form the crown of the entire structure.

The treatment of the two lower floors is such as to permit show windows as large as possible for space devoted entirely to retail stores. Use has been made of pilasters and spandrels of cast iron which cover the girders and columns. At the top of the second story front is placed an ornamental cresting of cast iron and the base of this show window area is of black fossil marble, the entire composition giving the building the effect of being securely anchored to the ground behind and below this show window space and independent of it—a far more successful arrangement than would have followed the apparent resting of the building upon inadequate stone piers.

THE SHEDD MAUSOLEUM, LOWELL, MASS. PLATE 56. The design of this family tomb is based upon the Greek stèle. The walls are battered on each elevation and together with the roof slabs are of white granite from New Hampshire. Doors, vases, slab rings and ventilator are of greenish bronze. The interior of the mausoleum is of pink marble and contains six niches, three on each side of the axis, which are lined with black slate.

WHITMAN MONUMENT, MT. AUBURN CEMETERY, CAMBRIDGE. PLATE 57. With the exception of the base course, which is of pink granite from North Carolina, this monument is constructed entirely of pink marble. It rests upon a foundation of solid concrete, 6 x 8 in plan and 5 feet deep. The marble has been given a treatment with the pneumatic tool which produces a surface that keeps clean automatically.

EDITORIAL COMMENT

CONSTRUCTION AND UNEMPLOYMENT

THIS month sees the formation of a capable group, called together by President Harding to consider the unemployment that exists generally throughout the country. Unemployment is the natural outcome of the disjointed business conditions we have been struggling with for several months, but distressing as the situation is, it is not without a redeeming feature if we will recognize the opportunity it offers for finding some means of stabilization in future. In prosperous times there is little incentive to take count of cost; wasteful practices creep in unnoticed and steadily cause losses that are not recognized as such until the cumulative mass appears in a period of depression.

This is a situation particularly true of the building industry. It has been realized dimly for some time but the real seriousness of the waste in construction was emphasized for the first time in the report of the Engineering Council's Committee on Elimination of Waste in the Building Industry. The wastes principally stressed in this report are those due to seasonal employment and they occur in the industry in normal times as well as in periods of depression. How much greater their effect will be this year is easy to estimate when it is recalled that the present construction season, rapidly approaching the customary shut-down, will add to the number of unemployed many hundreds of building mechanics and laborers.

This probable addition to the number of the unemployed is a matter deserving of immediate and serious attention. There is no logical reason for the abandonment of construction during the winter months in most sections of the United States. It is merely the result of custom dating from the days when our appliances and methods for handling construction were of the simplest order. Winter building under those conditions meant delay and increased costs, but with proper organization and equipment, construction can be carried on now practically as well in one season as another.

Much of the distress that will result from a suspension of work can be eliminated by carrying out a program of public works, both highway and building construction. Officials, zealous in their efforts to procure the most for the expenditure of public funds, may argue that such construction can be had at a lower price later on. This may or may not be so; it is nothing but common sense, however, to figure that any extra expense is well incurred if it provides employment to people who would otherwise be suffering and depending on bread lines for their maintenance. Another important consideration bears on our efforts to complete the readjustment of prices. Material prices can only be reduced as operations in manufacturing are continuous and a normal rate of production maintained. The stopping of building will make necessary partial or complete closing of quarries and manufacturing plants serving the industry, which will increase their costs and further delay readjustment.

There are many hundreds of competent workmen ready to give a fair day's work for fair wages, and due to the special conditions now existing there need be no fear of the excess labor cost and general inefficiency that characterized immediate post-war days. The construction industry can give employment to many thousands and create a demand for materials that will be an important factor in holding and steadying business conditions.

Both private and public work should be undertaken now wherever feasible — the former because of certain definite advantages in the way of prices and service that can be had now, and the latter in a sense of duty to the general welfare. Architects should make a careful survey of their local conditions, find out the favorable conditions and exert their efforts in influencing clients and their local government authorities to build in all cases that show justification.

There is nothing of a charitable or paternalistic nature in strongly advocating public construction at this time. Improved roads and new public buildings are needed in every community. In many cases funds are available through the sale of bonds or the issue of bonds already authorized; it requires only the go ahead signal from public officials. This work can be produced at as low a cost now as later, when competition with private work will tend to hold prices up. The communities will have the use of facilities they need, and, what is of more immediate import, labor released from private work will be absorbed, insuring continued earnings which will stimulate general retail business.

The general subject of seasonal employment should be given consideration in every locality. The engineering report just referred to asserts that the average wasted or lost time in Philadelphia runs as high as 44 per cent among iron workers, 37 per cent among cement finishers, 36 per cent among steamfitters, 40 per cent among roofers, and 29 per cent among painters and paper hangers. A recent investigation in Boston by the Congress of the Construction Industry reveals similar percentages. The greater portion of this loss is due to seasonal employment, and if architects and others would influence more uniform employment, the resulting savings would soon appear in the cost of finished buildings.

DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED PROFESSIONAL & DESIGN INTERESTS WITH SPECIAL REFERENCE TO AVAILABLE MATERIALS

It will be the purpose in this Department to illustrate, as far as practicable, modern interiors furnished with articles obtainable in the markets, and the Editors will be pleased to advise interested readers the sources from which such material may be obtained

CEILING IN A ROMAN PALAZZO OF THE EARLY SIXTEENTH CENTURY

The timbers which divide the ceiling area into squares are carved and colored to emphasize the principal lines. The soffits are polychromed in slightly softer colors. Such a ceiling could be effectively worked out in wood of a light color, with color and gilding

Interiors Adapted from the Italian

PART II. CEILINGS AND WALLS

By WALTER F. WHEELER

HARDLY any detail connected with an interior of any kind is more important than the ceiling which, together with the walls, forms the room. The similarity of the word itself to *ciel*, the French for sky, has frequently been pointed out, but whatever its derivation, the analogy is not difficult to trace.

In the treatment of Italian interiors the ceiling assumes an importance not always so great in interiors of other types, for its form immediately indicates the character of the room, since while the walls are often of plaster of the most rigidly severe type the ceiling may be wrought out with a more or less intricate pattern. True, the ceiling itself may be of plaster as well as the walls, but often it will be found to be of timber and of some one of a number of well known forms. Where a ceiling is of plaster it may vary from the usual flat type and be given a vaulted appearance, such as is suggested in Plate 46 of the September FORUM. It must be borne in mind that the very essence of success in dealing with interiors in the Italian style lies in the use of good proportions and that the use of this form of ceiling treatment tends to reduce the vertical dimensions of a room and to emphasize its horizontal proportions, which is often to be desired.

The timber ceiling is often used to give the effect of contrast which always follows the use of two wholly different materials—contrast not only of color, but also of texture and general character. The ceiling of timber may be severely simple, the joists being merely exposed, or else it may be given a "coffered" form and divided into quite a number of units which may be treated in a manner as severe or as elaborate as may be desirable. In either instance the spaces between the timbers may be plastered or covered with wood, and the timbers themselves may be merely somewhat smoothed off and left to tone down with time, or very slightly oiled, or else treated in polychromed designs. Where the joists are to be left exposed considerable dignity is added to the appearance by placing heavy supporting timbers beneath the joists and running at right angles to them. The dignity of this treatment is increased when the ends of these beams, where they join the walls, are supported by corbels or brackets such as are shown in a number of these illustrations.

Fireplace in Washington Mews, New York
Eric Gugler, Architect
Cement columns uphold cornice of unfinished walnut; plaster on walls and between joists

This treatment gives a rich and somewhat formal dignity but in some instances, particularly when a large room is square or so nearly so that neither dimension is notably the larger, the preferred treatment may take the form already suggested by which the entire ceiling area is divided by beams placed at right angles which of course divide the area into smaller squares; these smaller squares may be treated in several ways, depending upon the character of the room, the purposes which it is to serve, and the amount which the client is willing to expend upon it. In its simplest form the spaces between the beams may be merely plastered; in a more elaborate treatment these spaces may themselves be divided by smaller timbers, placed somewhat higher and with decoration of some kind upon the spaces between, while other forms of enrichment, involving carving of wood, modeling of plaster and rich painting and gilding of all the surfaces, would of course place the ceiling in the class of those highly intricate and ornate compositions which characterized the work of the renaissance builders at the height of its splendor. A treatment of this kind is shown on page 114 of the September number. There are instances where a wooden ceiling is desired but where none of the forms of treatment thus far described seems desirable. Another variation is the type where below the joists a false ceiling is built, arranged in small, shallow panels which may be square, octagonal or given other geometrical forms. The timbers as well as the spaces between may be painted with flat decoration or carved in low relief. The majority of these ceilings are probably carried out in dark tones, but equally effective results may be had with lighter colors. A recent example of such treatment is of wood bleached to a light tan, the relief ornament picked out in gold with a few soft colors discernible on close examination, the general effect being that of a dull gold which agrees well with the architectural design.

It must not be supposed that treatment of a ceiling by any one of the methods here described entirely precludes the use of a frieze just beneath

the ceiling, even when the ends of the heavy beams are supported by brackets or corbels. A frieze was often used in such cases, but it of course increased considerably the richness of the treatment and for that reason might not always be desirable. Another treatment, in many cases successful, consists in having a series of heavy mouldings placed on the walls just below the ceiling timbers in the nature of a cornice. This relieves the severity of the abrupt transition from vertical to horizontal surfaces,—but here again restraint and careful judgment must be used, for such is the subtlety of this style that sometimes an abrupt transition may be exactly what the architect requires for the proper interpretation of his design.

Hall in Villa Caronia, Florence
Vaulted plaster ceiling; polychromed doorway; walnut furniture

When a ceiling is built of open timbers in any of the forms which have been mentioned here, opportunity is afforded for the use of decoration in polychrome which may be either simple or ornate as circumstances demand. In designing such ornament for ceiling timbers it has been found that the result is improved by the avoiding of too much minute and intricate detail, and by the use of design which is somewhat bold and vigorous; this is of course because a ceiling in a room thus treated would generally be placed at a comparatively considerable height, and design of too minute a character would not possess sufficient force to make it effective. For the same reason the colors used should be definite and decided — such colors as

Corner in a Music Room of a House near Boston. Harry B. Russell, Architect

Woodwork and open timber ceiling, stained dark brown; plaster walls of mottled ivory tones
Dimensions of room, 20 by 20 feet; ceiling height, 12 feet; fireplace opening, 4 feet 3 inches high and 4 feet 2 inches wide

"carry" well—and it would be wise to avoid all the subtle shades and indefinite colors which are admirable for some purposes but which are not sufficiently forceful or robust for use upon a lofty ceiling. The dark color of the wood itself is certain to absorb something of the brilliance of whatever colors are used, and this should be allowed for so that the finished work will be sufficiently vigorous.

Walls share with ceilings the important function of enclosing or defining a room; they might even seem to be of greater importance, since they are necessary to support the ceiling. Here again there are several forms of treatment which are quite suitable and which, since they are of varying degrees of cost, afford a broad range of selection. In many instances the walls may be of plaster which may be treated in any one of several ways. Nothing affords a more excellent foil for objects to be placed against the wall than plaster, and this is all-important when it is remembered that in the careful handling of contrasts much of the interest of the Italian style is found. Plaster forms a suitable background for tapestries, furniture, carved wood or paintings which are sufficiently strong, but it may be readily seen that a style which is itself so vigorous and forceful requires that furnishings be equally virile.

Library in a New York Apartment. Charles A. Platt, Architect
Polychromed wood ceiling; woodwork stained brown; hangings of old red brocatelle, hung from cornice

The finishing of plaster walls, unless they are to be covered with figured decoration of some kind, is an item which has much to do with the success of a finished interior. The inner walls of many of the older Italian houses were of stone or marble, which of course gives a note of architectural strength and dignity very important in interiors such as are here being discussed, and which was secured in later days by the use of plaster treated to give something of the effect of stone. To get this effect in plaster requires a treatment which shall contribute a surface in which play of texture and color gives quiet interest, variety and sobriety—a fitting background for tapestries, strong and heavy furniture, dark in color as in chestnut, the wood mostly used in Italy. Having laid up the wall, the final coat of plaster is rough troweled in areas of surface instead of being given sand or smooth finish. Over this surface which is close to that of a travertine marble, soft umbers and sienas (rotten stone in two tones is one of the best pigments) are washed on, preferably in water medium. Then a general going over with a sponge or brush stippler brings the surface to the desired variation and softness. If a wall of travertine marble is kept in mind,—with its richness of texture and the softening and staining and dusting of time,—an agreeable and fitting wall is the result, quite in the spirit of Italy.

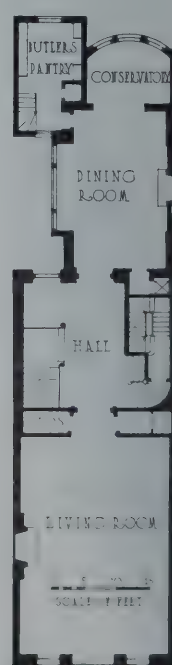
Excellent results sometimes follow the use of dry colors mixed with the last coat of plaster, and pigments in powder form are to be had for this specific purpose. The process of marbleizing, used in Italy from the earliest times, supplies an effective and comparatively inexpensive method of treating wall surfaces, being used also on woodwork and sometimes on furniture and even on floors. Its use is quite legitimate and marbleizing is employed on even the best work where expense is not one of the chief considerations, since it does not pretend to be an exact imitation of real marble but rather a means of securing the rich effect of marble without its coldness and hard glitter. Marbleizing is particularly useful for wainscoting, as suggested in the illustration of the loggia on Plate 61 or to emphasize panels or the inner surfaces of niches, as may be seen from the illustration on page 159. The marbleizing process is quite simple in principle but of course requires considerable experience to make the result as finished as it should be. The

Main Hall, House of Charles E. Mitchell, Esq.
Walker & Gillette, Architects
Plaster walls as a foil for a Spanish portrait and a carved bench of Italian design

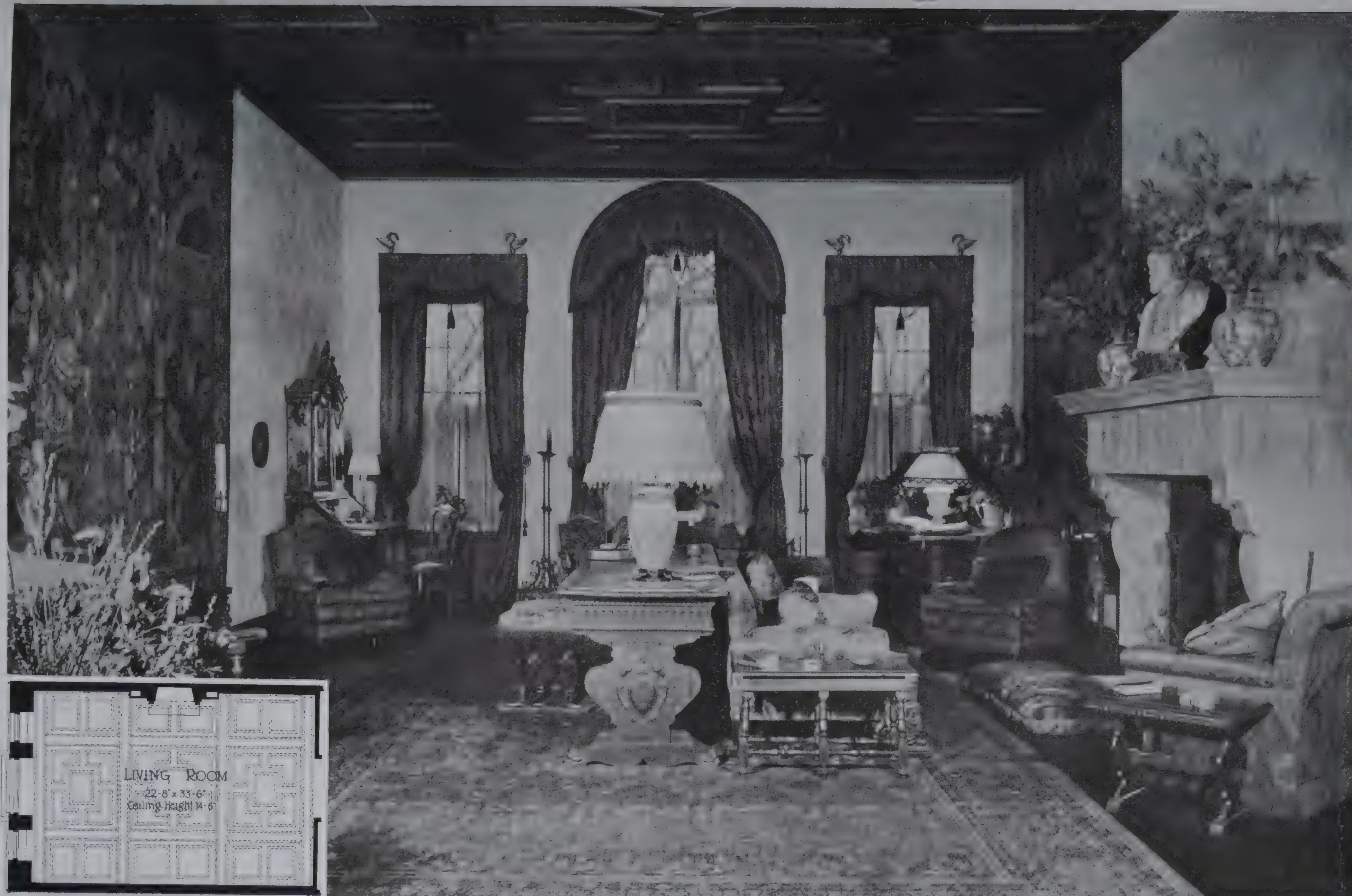
treatment consists of the application of one paint over another, choice being made of colors that contrast well. The paint used to produce the veining, upon a body color, is mixed thick and then "scumbled" on—thinly spread or rubbed with a hard brush. One of the most successful results of marbleizing is often had when the effect is to be that of black and gold marble, heightened in certain spots by the use of small fragments of gold leaf. There is no end to the color combinations which may be used, and this is one reason for the vogue of the marbleizing process through many centuries.

The use of painted figure decoration upon walls affords possibilities of varied effects. Perhaps the taste of even the sixteenth century wearied of too austere a handling of its walls, or else the architects may have had to provide for families not possessed of the rich tapestries or splendid portraits which are seen to such advantage against plain plaster. The plain walls, as already pointed out, were usually of rough plaster to afford desirable textures. In other cases smooth surfaces were employed and polychrome treatment was applied and this, when the design was not too intricate, afforded a rich and satisfying result without in any way detracting from architectural dignity. Several of these illustrations deal with interiors so treated and it will be realized that this development is often helpful when furnishings are hardly adequate to the architectural requirements. Recent examples of the domestic use of mural decoration in America prove what excellent results are to be had, and the attention of architects and decorators may well be turned toward it.

The thickness of walls such as are common in Italy affords considerable opportunity for splaying the openings of doors and windows, often with excellent effect. When the walls about them are of plaster, unornamented, these deeply splayed surfaces may be treated in polychrome design, the contrast affording an acceptable relief to the severity of plain walls; when the wall surfaces are themselves ornamented the splayed jambs and sills



Dining Room and Plan of Main Floor, House of Charles E. Mitchell, Esq., New York. Walker & Gillette, Architects
Vaulted ceiling, plaster walls of uneven texture and stone mantel afford an architectural setting for Italian furniture



LIVING ROOM IN HOUSE OF CHARLES E. MITCHELL, ESQ., NEW YORK

WALKER & GILLETTE, ARCHITECTS

Beamed and paneled ceiling of cypress, painted in dark tones; walls of brown water glazed plaster; woodwork, walnut with antique finish Hangings, green damask

UPPER HALLWAY LOOKING TOWARD DINING ROOM

Trim and base are marbleized in tones of green.
Walls of plaster with brown water glazed finish

SIDE OF LIVING ROOM OPPOSITE FIREPLACE

Interesting grouping of furniture with large tapestry providing the main feature for a long wall

HOUSE OF CHARLES E. MITCHELL, ESQ., NEW YORK

WALKER & GILLETTE, ARCHITECTS

WINDOW IN DINING ROOM

Vaulted ceiling, finished in brown water glazed plaster; sash leaded and glazed with translucent glass

WINDOW IN UPPER HALL

Wood trim, marbleized in green. Note painted jambs and arched soffit against plain plaster walls

HOUSE OF CHARLES E. MITCHELL, ESQ., NEW YORK

WALKER & GILLETTE, ARCHITECTS

"LOGGIA OF THE DANCING MAIDENS" IN HOUSE OF H. H. ROGERS, ESQ., SOUTHAMPTON, L. I.

WALKER & GILLETTE, ARCHITECTS — DECORATIONS BY ROBERT S. CHASE

The panels based on the work of Gozzoli, Mantegna and others of the period. The paintings are in tones of umber, blue and green with a marbleized wainscot and floor of dark artificial travertine

An Illustration of the Value of Marbleizing in Contrast with Surfaces of Plain Color. Hampton Shops, Decorators

may be without ornament, which often produces a highly desirable result. Jambs and sills splayed and treated in similar fashion are useful for the tiny inches or alcoves which the Italian builders were fond of using occasionally to break the monotony of large expanses of wall surface. Sometimes these small niches in the thick walls would be fitted with doors and thus converted into tiny cupboards, the doors themselves sometimes being given polychrome ornament when such a treatment would heighten the decorative effect.

Covering the walls of a room with fabrics of different kinds may have been an outgrowth of the use of tapestries hung upon walls. Architects and decorators often find that clients demur when this form of wall covering is proposed, the idea being distasteful to many since these fabrics are generally fixed to the wall and cannot be easily removed for necessary cleaning. This objection may be entirely overcome when such fabrics are arranged as suggested in the illustration on page 157 where the wall coverings are suspended from hooks placed in the wall just beneath the cornice, from which they are readily taken down for an occasional brushing. Made as these wall coverings are, in large panels or sections, considerable use may be made of borders to create a certain contrast in the hangings themselves, although such a use of borders would only be possible, perhaps, in an instance such as that illustrated where the wall spaces are but little cut into by openings.

The use of fabrics upon walls has a particular value in that it gives a room what might be called a "furnished" appearance even when but little furniture is used. Fortunately for the architect or decorator, a few American manufacturers of fabrics, who realize that the public taste long ago abandoned false gods and turned to an appreciation of the historic periods of architecture and ornament, have reproduced with astonishing fidelity to the originals a large number of fabrics which for use in decorating and furnishing in the Italian manner are precisely what are needed. The modern makers of tapestries have learned many of the secrets of the tapestry weavers of the golden age of the art, and the output of their looms, possessing the rich softness which characterizes tapestries, is available to present-day architects and decorators.

It will be realized by the architect or decorator at all familiar with the present markets that they afford every advantage for a correct interpretation of Italian domestic interiors. An appropriate architectural setting may be obtained with very simple materials used with judgment and discrimination, and the interior thus secured may be developed at no excessive cost with modern furnishings of various kinds which are true to the period.

Walls and Ceilings Polychromed in All-over Patterns Are Often Useful Where Important Furnishings Are Wanting

Investigate the Furniture Market Now

WITH the opening of the fall season, a period during which there is a great increase of activity in furniture and decorative material show rooms, architects will find it well worth while to visit them, even if no particular purchase may be under consideration. The most interesting impression which will be gained is the fact that prices have been reduced, which should encourage many clients to buy now. A large number of new consignments of imported furniture and objects of art have been received and are on display and for sale at moderate costs. There has been a distinct tendency on the part of American manufacturers of good furniture to increase the stock output of furniture showing definite period influence. For example, there has never before been in the market so varied and interesting a collection of dining room furniture showing the influence of the Italian renaissance period.

In the field of floor coverings the reduction in cost is quite noticeable. Large shipments of oriental rugs have been received. Fine chenille carpets of Czecho-Slovakian manufacture may be had at moderate costs, comparing favorably with good grades of Scotch chenille. Rugs of Chinese manufacture and motif are to be had at prices closely approximating the cost of good grades of domestic carpets. It has been many years since the costs of furniture and of decorative materials of every kind have been so moderate and this condition will undoubtedly lead to the remodeling and refurnishing of many existing dwellings, and to the placing of interior decorating and furnishing commissions on a large scale for new houses.

Architects will find that the designs of furniture, lighting fixtures, fabrics, wall paper and other decorative materials are in many cases full of suggestion and inspiration, and while the interior architecture of special rooms may be under consideration, it will be found that time spent in the various show rooms may have a direct effect in the designing of other interiors. We have known of several recent instances where interiors have been specially designed to form the background or setting for furniture and decorations selected by clients. The artistic atmosphere of the show rooms is in itself inspiring, and nowhere else will there be found such attractive studies of color, line and proportion.

In some sales rooms a practice is made of arranging certain areas as rooms in definite period styles. The rooms are correctly carried out to the smallest detail, and ceilings, walls and floors as well as furnishings and accessories of different sorts may thus be studied in combinations which exhibit to the greatest advantage the furniture, fabrics, or whatever else is sold in the establishment arranging the display. The architect who investigates, even casually, the American markets for furniture and furnishings of various sorts will find renewed interest and fresh zest in design which will have its effect on the work of his office and on the service which his office renders to his clients.

A Walnut Credenza of Architectural Character after a Piece in the Davanzati Collection
An excellent example of craftsmanship and design qualities of modern reproductions available in stock

SERVICE SECTION

of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

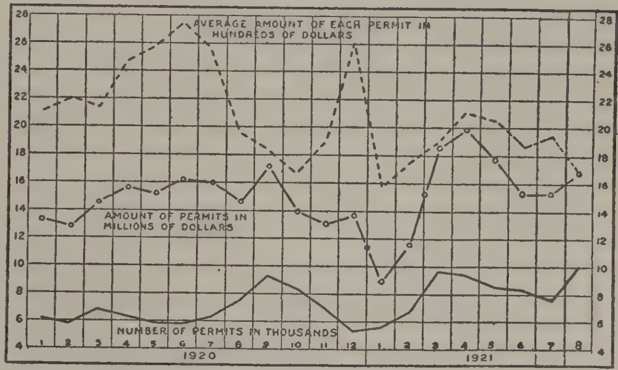
The Building Construction Outlook

IT is evident that the early fall season of 1921 ushers in a period of increased activity in architects' offices. One definite indication of this fact is to be found in an increasing demand for the services of draftsmen. From many offices in different sections of the country we are receiving more optimistic reports. In a number of instances, particularly from small offices engaged principally in residential work, it is evident that business is progressing in full volume, where two months ago very little was being done. The reports regarding building permits show a greatly increased volume of residential construction during the month of August, which is significant.

At the present time, in the vicinity of New York, the tax-exemption measure, together with material reductions in the cost of residential construction, is fulfilling every prophecy in creating a great volume of moderate cost residential construction in the sections of the city which still enjoy comparatively low real estate valuations. Two-thirds of the volume of construction now proceeding in New York comes under the residential classification. The beginning of a real boom in the construction of moderate cost apartment houses is to be noted in the Bronx and in Queens. Turning to other sections of the country, we note in each case an increase in the volume of residential construction. The Federal Reserve Bank of San Francisco reports:

"The need for new dwellings, combined with declining costs of building materials and the settlement of several wage controversies in the building trades, caused a large increase in both the number and value of building permits issued during August. In San Francisco work has been resumed on the majority of those buildings upon which operations were suspended when the building trades struck on May 13, last."

On this page is a graphic presentation showing the index of building permits issued in the 20 principal cities of the Twelfth Federal Reserve District (including San Francisco, Spokane, Portland and Seattle) in 1920 and 1921. From this chart the effect of decreased building cost and increased activity in residential construction may be easily deduced. It may be noted that the cost of the individual operation is decreasing, but that the number of permits and the aggregate amount of money involved are increasing.



Building Permits Issued in 20 Principal Cities, Twelfth Federal Reserve District, 1920-1921

Building Costs

Building costs in general are still dropping. The index number for September, as developed by the *Engineering News-Record*, and explained in the September issue of THE FORUM, stands at 188.27, which is a decrease of 5.2 or 2.7% over a period of 30 days. General construction cost is 24% cheaper than one year ago, and 31% under the peak. It is safe to say that this decrease in cost is still greater as applied to residential construction. From actual figures submitted to THE FORUM it may be said that residential construction is 30% less than it was one year ago and close to 35% under the peak.

Cities	Brick-layers	Car-penters	Hoisting Engineers	Hod Carriers	Pile Drivers	Structural Iron Workers	Common Labor
Atlanta	$0.90P	$0.70P	$1.00P	$0.30P	....	$1.00P	$0.20P
Baltimore	1.25P	.80P	.87½P	.54P	$0.74P	1.00P	—.30P
Birmingham	1.00P	.75P	....	.25	....	1.00P	.15@.25
Boston	.90P	.90P	.90P	.60P	.90P	.90P	.55P
Cincinnati	1.25P	1.00P	.70E	.85P	1.00E	1.25P	.35@.40
Chicago	1.25	1.25	....	....	.....	1.25	1.00
Cleveland	—1.04P	—1.04P	—1.04P	— .60P	— .91P	—1.04P	—.57½P
Dallas	1.00P	1.00P	1.00E	.60E	1.00E	1.00E	.50@.75P
Denver	1.37½	1.00	1.00	.75@.81¼	1.00	1.00	.37½@.50P
Detroit	1.00P	.80P	80@.90P	.50@.60P	1.00P	60@.80P	.50P
Kansas City	1.07½	1.00	1.00	.80	1.07½	1.07½	.70
Los Angeles	1.25P	1.00P	1.00P	1.12½P	1.00P	1.00P	50@.56¼P
Minneapolis	1.00P	.80P	.80P	.65P	.....	.80P	.50P
Montreal	.90P	.65P	.60P	.40P	.50P	.65P	.30P
New Orleans	1.00P	.88P	.90P	.40P	.80P	1.00P	.30P
New York	1.25	1.12½	1.25	.87½	1.12½	1.12½	.75@.80
Pittsburgh	1.12½P	1.00P	1.00P	.80P	.....	1.00P	Open
St. Louis	1.25P	1.25P	1.25P	.85P	1.25P	1.25P	.67½P
San Francisco	1.25P	1.12½P	1.12½P	1.00P	1.12½P	1.12½P	.81¼P
Seattle	1.00P	.80P	.80P	.70P	1.00P	.87½P	.50P

S means scarce; E, enough; P, plentiful—Higher rates indicated by +, decreases by—

Tabulation of Wage Rates in Building Trades in September, 1921

Reported through the Engineering News-Record

From several sources it is reported that the financing of new buildings is being made somewhat easier. This is principally in response to the appeal of Secretary of Commerce Hoover and to a natural reaction toward real estate investments which will be made in increasing volume as the purchasing power of the dollar increases, making fixed incomes of greater intrinsic value.

Labor Conditions

The interesting phase of the labor situation now is the gradual settling down on a basis of lower labor costs. The arbitration decision of Judge Landis, as explained in the last issue of THE FORUM, is having the expected effect in many sections of the country. In this connection the tabulation recently prepared by the *Engineering News-Record*, showing the hourly wage in a number of the building trades and reproduced on the preceding page, will prove of value.

Examples of Decreased Building Costs

IN an article in the Business and Finance Section of the September issue of THE FORUM particular stress was laid on the advisability of refiguring work, particularly in the residential classification. An instance was cited showing the feasibility of this method of getting new business. There has just come to our attention another instance of the development of an active project in a somewhat similar way.

About April of last year a prospective client visited the offices of an architectural firm, saying that he wished to build a residence. He gave the approximate requirements, and plans were drawn. When figures were taken on this work, it was found that the lowest bid, either through the several contract or general contract method, approximated $67,000. Upon receiving this figure, the client decided not to build, saying at the time, however, that he would be willing to spend approximately $45,000. In taking new figures in June, 1921, considerable variation in bids was found. For instance, three firms bidding on the masonry work alone submitted as their figures $17,000, $21,200 and $18,600. At that time bids for the carpentry, roofing, sheet metal work and painting averaged $34,000.

Consequently, the project was for the time abandoned. In August, however, only two months later, in taking other figures, the architects found that bids were being submitted on a more stable basis and at definitely lower cost. Therefore, bids were again invited. On the masonry work a bid was received for $14,400. On the carpentry, roofing, sheet metal work and painting a bid was received for $27,000, being $7,000 less than two months before.

Taking these various figures into consideration, together with bids on other branches of the work, the costs as of Sept. 1, 1921, were:

Carpentry, roofing, sheet metal work and painting	$27,000
Masonry	14,400
Heating	2,800
Electrical installation	440
Plumbing	4,600
	$49,240

On a basis of these figures the owner has practically made up his mind to proceed at once with construction, in order that building may be carried on through the fall and he may have the house ready for spring occupancy.

What $250 Bought in 1920 and What It Will Buy Now

AN interesting tabulation giving the decrease in prices of building materials and labor was recently presented by Richard C. Ferge in the *Builders' Bulletin* of Milwaukee. From this tabulation this comparison has been made showing the decreased prices in one year:

1920		1921	
1,000 ft. clear maple flooring	$250	1,000 ft. clear maple flooring	$100
		1,000 ft. 2x10 joists	39
		1,000 ft. 2x2 studs	39
		1,000 ft. 1x6 d. and m.	37
		5,000 ft. shingles	25
		6 rolls building paper	10
	$250		$250

1920		1921	
200 hrs. mason labor	$250	250 hrs. mason labor	$250
250 hrs. carpenter labor	250	312½ hrs. carpenter labor	250

Cubic Foot Costs in New York

At the present time building material costs have reached levels comparable with those of 1919. In most sections of the country the labor situation is still unsettled and this fact seems to discourage the undertaking of new building operations. According to the Dow Service this is particularly true in the New York district where there still exists a state of protest against high wages in the building trades. In this connection some interesting data on cubic foot costs have been recently presented:

As expressed in the cubic foot cost of a walk-up type of non-fireproof construction tenement or apartment house today, the cost may be 40 cents net, as against 45 cents in 1919 and 28 cents in 1912. For a six-story elevator apartment, the cost is roughly 50 cents net per cubic foot today, as against 55 cents in 1919 and 32 cents in 1912. For a ten-story, high-class elevator apartment the price today will approximate 80 cents net, as against 82 cents in 1919 and 35 cents in 1912.

Whether the position is legitimately taken or not, the investing builder looks at the unchanged post-war time wage peak, still operative in New York, and notes that building material prices have receded, though grudgingly, in the same length of time. He promptly blames both the building trade employer as well as the building trade employe for keeping the cost of construction so close to the post-war peak levels.

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(a) That each Committee member shall be a representative leader in his line;
(b) That no Committee member has affiliations with any manufacturer;
(c) That no Committee member will be called upon for detailed service except by special arrangement;
(d) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

FINANCE

WALTER STABLER

Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER

President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN

President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

SAFETY ENGINEERING

S. J. WILLIAMS

Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN

Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM and THE BUILDERS' JOURNAL.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise in this connection.

AUTOMOTIVE BUILDINGS

HAROLD F. BLANCHARD

For years a specialist in the layout and equipment of buildings of this type. Mr. Blanchard is a mechanical engineer and has practical knowledge of special conditions in many sections of the country through personal investigation.

FIRE PROTECTION ENGINEERING

J. D. HUNTER

Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.

President, The Agricultural Engineering Company, Columbus, Ohio. Professor and Head of Department of Agricultural Engineering, Ohio State University.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

LEGAL QUESTIONS

WILLIAM L. BOWMAN

Attorney, Member of the New York Bar

Specialist in legal matters pertaining to real estate and building contracts.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

	NEW ENGLAND						NEW YORK				
Item	Portland, Me.§	Boston, Mass.	Providence, R. I.	Hartford, Conn.	New Haven	New York City	Albany, N. Y.†††	Utica††	Syracuse	Oswego	Binghampton
(1) Bulk Lime....per cwt.	....	....	....	....	....	....	....	....	....	$1.25	...
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$3.05	$3.20	$3.25	$4.60	....	....	....	$3.10	$3.10	3.90	$3 00
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	4.15	4.50*	4.60*	$4.50	$4.50*	$5.00*	4.65	4.60	4.75	4.50
(4) Crushed Stone....per ton	....	2.50	....	4.35	....	....	2.75	3.60	2.20	3.20	....
(5) Crushed Stone....per yd.	....	....	3.75	3.50	....	4.00*	....	....	2.64	5.25	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	32.00	18.00	28.00	17.00	25.00	17.50	20.00	22.00	20.00	30.00	22.00
(7) Corner Bead, galvanized....per ft.	.045	.04	.05	.045	.05	....	.06	.05	.05	.05	.05
(8) Drain Tile, 4 in....per ft.	.12	.08525	.16	.08	.10	....	.09	.0745	.065	.06	.06
(9) Drain Tile, 6 in....per ft.	....	.128	.30	.14	.15	....	.155	.129	.125	.07	.105
(10) Flue Lining, 8½ in. x 8½ in....per ft.	.30*	40%*	.45	.35	.36	....	40%*	.275	.30	.33	.33
(11) Flue Lining, 8½ in. x 13 in....per ft.	.45*	40%*	675	.54	.54	....	40%*	.40	.45	.50	.50
(12) Fire Brick, Standard 9 in. No. 1 Clay....per M.	85.00	75.00	90 00	70.00	70.00	75.00	80 00	65.00	73.00	80.00	75.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags....per ton	125.00	25.00*	30.00*	25.00	21.43	15.00*	20.00	13.50	15.00	25.00	20.00
(14) Gravel, washed....per yd.	2.00*	2.75*	2.00	2.50*	....	3.25*	2.00	....	...	....	....
(15) Hollow Building Tile (8x12x12 in.)....per M.	*	280.00	....	300.00	....	221.10	350.00*	240.25	250.00	275.00	300.00
(16) Hollow Building Tile (8x5x12 in.)....per M.	*	68.50	....	....	....	117.90	200.00	....	135.00	....	....
(17) Hydrated Lime (mason's) in 50 lb. paper bags....per bag	.60	.50	.80	.575	.55	.5125	.60	.525	.60	.65	.50
(18) Hydrated Lime (finishing) in 50 lb. paper bags....per bag	....	.55	.85	.625	60	.60	.70	.606	.70	.75*	.65
(19) Hair....per bu.	.45	.45	.55	.80*	.55	.675*	.75	.50	.50	.75	....
(20) Metal Lath, Exp., Gauge No. 24, weight 3.4 lbs.‡....per yd.	.35	.322	.38	.35	.33	.2933	.40	.33	.32	.45	....
(21) Metal Lath, Expanded, Gauge No. 25, weight 3 lbs....per yd.	.35	.32	.37	.34	.32	.2264*	.38	....	.30	....	....
(22) Mortar Color, red....per lb.	.05	.03	.03	.025	.03	.03	.035	.025	.05	.05	.03
(23) Mortar Color, buff....per lb.	.10	.15	.04	.08	.04	.04	.06	.0325	.05	....	.05
(24) Mortar Color, double strength, black....per lb.	....	.35	.07	.30	.30	....	.06	.0575	.08	.10	.15
(25) Partition Tile, Clay (3x12x12 in.)....per M.	....	160.00	200.00	150.00	160.00	136.40*	160.00	....	150.00	180.00	....
(26) Partition Tile, Clay (4x12x12 in.)....per M.	....	150.00	220.00	160.00	170.00	153.50*	170.00	129.75	160.00	200.00	160.00
(27) Partition Tile, Gypsum (3x12x30 in.)....per ft.	....	.18	.20	.155	.17	....	.18	....	.15	....	.18
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.20	.24	.19	.20	....	.20	....	.16	....	.20
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)....per bbl.	3.70	3.50	3.70	3.80	3.45	3.20	3.60	3.85	3.30	3.35	3.50
(30) Extra charge for each cloth sk....per sk.	.10	.10	.075	.08	.075	.10	.10	.075	.075	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	90.00	75.00	....	....	....	....	....	....	65.00	75.00	....
(32) Plaster Board, ⅜ in. thick....per M. sq. ft.	40.00	34.00	40.00	28.00*	32.50	.28*	.28*	34.50	35.00	32.00	35.00
(33) Sand (Building)....per ton	1.25*	2.00	....	....	....	....	....	2.50	....	....	4.00
(34) Sand (Building)....per yd.	....	2.50	2.00	1.50	....	1.80	2.00	....	....	4.00	....
(35) Sewer Pipe, single strength, off list....per cent.	25%	40%	30%	40%	40%	20%	40%	53%	50%	45%	45%
(36) Wall Coping, 9 in....per ft.	.20	35%*	.32	.24*	.24*	.32	40%*	.36	.20	.22	.22
(37) Wall Coping, 13 in....per ft.	.30	35%*	.48	.36*	.36*	.48	40%*	.54	.30	.33	.33
(38) Wall Plaster, neat, in paper, in 80 lb. bags....per ton	....	....	....	25.00	....	....	....	....	18.75	....	20.00
(39) Wall Plaster, neat, in cloth, 100 lb. sks, incl. sks....per ton	24.00	24.00*	24.00*	24.00*	28.00	22.00*	26.00*	22.00*	20.50*	22.50	19.00*
(40) Wall Plaster, sanded, in cloth, 100 lb., incl. sks....per ton	....	21.00*	21.00*	20.50*	21.00*	18.00*	20.50*	15.00	14.20*	22.50	17.00
(41) Wall Plaster, wood fibre, in cloth, 100 lb., incl. sks....per ton	24.00	24.00*	24.00*	24.00*	28.00	26.00*	26.00*	22.00	20.50*	25.00*	20.00
(42) Wall Ties, galvanized....per M.	....	12.60	....	5.00	5.00	5.00	5.00	5.00	5.00	6.00	5.00
(43) Wall Plugs....per M.	....	35.00	35.00	....	30.00	30.00*	30.00	25.00	25.00	28.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	7.75	7.50*	9.50*	7.50*	....	8.50*	....	6.50†	7.00*	7.00*	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	2.10**	3.00*	....	3.50	....	....	4.35†	2.65†	3.00**	3.00†	4.00*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	2.85§*	2.30§*	3.50§	4.25§*	....	....	2.88§*	2.65§*	2.25	2.25§	4.25§
(47) Stucco Board, Medium wt....per M. sq. ft.	....	50 00	....	55.00*	....	70.00	....	60.00*	55.00	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	65.00	....	60.00*	....	....	....	....	60.00	....	....
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	....	8.50	9.50	11.50*	10.00	10.50*	....	10.00*	....	12.00	12.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	....	....	....	65.00	....	....	....	47.00	....	40.00	45.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	....	40.00*	....	45.00	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	....	35.00*	....	40.00	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	....	....	....	....	....	....	....	40.00	....	36.00	....
(54) 1x4 "B" Flooring....per M. Board ft.	....	....	....	60.00*	....	....	....	85.00*	....	62.00	....
(55) Yellow Pine Clear Finish....per M. Board ft.	....	....	....	80.00	....	....	....	90 00	....	75.00	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	65.00*	....	....	....	65.00	....	75.00	....
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	....	....	....	....	....	....	....	65 00*	....	50.00	....
(58) Cypress Finish Lumber....per M. Board ft.	....	....	....	125.00	....	....	....	160.00	....	160.00	....
(59) ¾x4 "B" Partition....per M. Board ft.	....	....	....	60.00	....	....	....	75.00*	....	75.00	85.00
(60) ½x4 "B" Ceiling....per M. Board ft.	....	....	....	50.00	....	....	....	60.00*	....	50.00	60.00
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	....	....	....	60.00*	....	....	....	60.00*	....	60.00	....
(62) Mouldings, Yellow Pine....over list	....	....	....	50%	....	....	....	....	....	.015*	....
(63) Washington 16 in., 5/2 Clears....per M.	....	....	....	....	....	....	....	6.75	....	6.50	6.75
(64) Washington 16 in., 5/2 Clears....per sq.	....	....	....	....	....	....	....	5.50	....	5.46	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	....	7.00	....	....	....	6.75	....	6.75	7.75
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	5.50	....	7.20	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow PineBoards...per M.	....	....	....	35.00*	....	....	....	45.00*	....	50.00	63.00*

*(Above Item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

§Portland, consumer prices; contractor quotations on application.

†††Albany allows 10% and 2% off to contractors before 10th of month following delivery.

Lime, Barreled (Item No. 3), 280 lbs.—Providence, Hartford, Albany, common; 300 lb. barrel, New York City; **Hydrated** (Items 17, 18)—Oswego, per bu. of 70 lbs.

Crushed Stone (5)—New York, per 2600 lb. yd.

Flue Lining (Item 10, 11)—Boston, Albany, off list. Portland, 25%—10% cash.

Fire Clay (Item 13)—New York City, 100 lb. bag rate; no credit for returned cloth sacks, Boston, New York, Providence.

Gravel (14)—New York, $2.75 to $3.25. Portland, F. O. B. cars; Bostan, Hartford, per ton.

Hollow Building Tile (Items 15-16)—Portland, not stocked in Portland; Albany, heavy, less 10% and 2%.

Hair (19)—New York, per lb.; Hartford, 4 lbs. per bu.

Metal Lath (Item 21)—New York City, Gauge 26.

Par. Tile (25, 26)—New York, less than 2,000 ft.

Plaster Board (Item 32)—New York City, Albany, price for each, size 32x36x⅜ in.; Hartford, 32x36x⅜.

Sand (Items 33-34)—Portland, at Pit.

Wall Coping (36, 37)—Boston, Albany, per cent. off; Hartford, (36) 8 inch. (37) 12 inch.

Wall Plaster (38, 39, 40, 41)—Returned bags, Syracuse, Utica, Providence, New Haven, 15c; Albany, Oswego, 10c each; Boston, 12c each; Hartford, 13c rebate for bags; New York City, 25c. Sacks extra, Binghamton.

Wall Plugs (Item 43)—New York, chiefly hardware dealers.

Roofing, Slate Surf. (Item 45)—70 lbs., Syracuse; Portland, 3 ply.

Roofing, Smooth Surf. (Item 46)—55 lbs., Boston, Hartford, Albany; 3 ply, 63 lbs., Utica; Portland, 3 ply.

Stucco Board (Items 47, 48)—Hartford, Utica, creosoted.

(Item 49)—Hartford, Utica, spruce; New York City, Eastern spruce. **(Items 51, 52)**—Utica, 1x6 and 1x8 inches. **(Item 54)**—Hartford, B Flat; Utica, flat grain; **(Item 56)**—Hartford, fir; **(Item 57)**—Utica, spruce; **(Item 59-60)**—Utica, B & Btr.; **(Item 61)**—Utica, 6 in.; Hartford, 6 in. Red Cedar; **(Item 62)**—Oswego, per inch; **(Item 67)**—Binghamton, Hartford, No. 2 C.; Utica, No. 3 Com.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. NEW YORK, PENNSYLVANIA, NEW JERSEY

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

	Elmira	Rochester	Buffalo★	Jamestown, N. Y.	Allentown, Pa.	Erie	Philadelphia	Reading	Pittsburgh	Scranton	Newark, N. J.	Paterson, N. J.
(1) Bulk Lime....per cwt.	....	....	Retail quotations on all items varied and uncertain	....	$0.75	....	$0.55	$0.65*	$1.00	$0.80	....	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$3.80	$3.50		....	3.00	$3.40	.75*	....	2.75	3.00	$3.15*	$ 3.21
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	5.25	4.75		....	4.00	5.10	....	....	....	....	5.70*	4.65
(4) Crushed Stone....per ton	....	2.50		....	2.10	2.30	4.25	2.50	7.00*	2.75	3.35	....
(5) Crushed Stone....per yd.	2.50	2.00		....	....	....	....	....	....	....	4.00	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	30.00	18.00		$25.00	19.50	25.00	20.00*	20.50	20.00	21.00	21.00	20.00
(7) Corner Bead, galvanized....per ft.	.07	.05		....	.06	.04	.035	.05	.06	.06	.05	.09
(8) Drain Tile, 4 in....per ft.	.07	.06	....	.08	....	.0525	....	.07	.06	.08	.10	.105
(9) Drain Tile, 6 in....per ft.	....	.11	....	....	....	.095	....	....	.12	.14	.1675	.17
10) Flue Lining, 8½ in. x 8½ in....per ft.	.50	.30	....	.42	.34	.27*	.36	.36	.30	.38	.30	.31
11) Flue Lining 8½ in. x 13 in....per ft.	.65	.45	....	.63	.52	.40*	.54	.54	.45	.57	.45	.47
12) Fire Brick, Standard 9-in. No. 1 clay....per M.	80.00	65.00	....	75.00	72.00	70.00	75.00	70.00	....	65.00	69.00	....
13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	20.00*	20.00	....	30.00*	18.00‡	15.00	22.00	18.00	20.00*	20.00*	17.00	....
14) Gravel, washed....per yd.	2.00*	2.75	....	....	....	3.50	2.55*	4.00*	2.00*	2.00*	4.20	....
15) Hollow Building Tile (8x12x12 in)....per M.	250.00	230.00*	....	....	235.20	....	....	....	148.40	260.00	240.00	260.00
16) Hollow Building Tile (8x5x12 in.)....per M.	230.00	250.00*	....	110.00	111.20	80.00	....	....	66.00	....	110.00	....
17) Hydrated Lime (masons) in 50-lb. paper bags....per bag	.90	.475	....	.75	.50	.475	.40625	.60	.50	.50	.50	.45
18) Hydrated Lime (finishing) in 50-lb. paper bags....per bag	.80	.50	....	.75	.64	.50	.5375	.75	.55	.60	.60	.50
19) Hair....per bu.	.65*	.75*	....	....	.75*	.15*	.40	.50	.75*	.70*	.70	.50*
20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡....per yd.	.45	.37	....	.39	.36	.37	.331	.31	.32	.31	.36	.40
21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.....per yd.	....	.35	....	....	....	.30	.2925	....	.32	....	.35	.43
22) Mortar Color, red....per lb.	.06	.06	....	.05	.035	.03	.035	.05	.0225	.06	.03	.03
23) Mortar Color, buff....per lb.	.06	.06	....	....	.041	.035	.035	.04	.0325	.06	.04	.03
24) Mortar Color, double strength black....per lb.	.10	.06	....	.06	.058	.06	.10	.10	.05	.08	.07	.10
25) Partition Tile, Clay (3x12x12 in.)....per M.	....	100.00	....	....	....	90.00	210.00	....	70.00	....	122.50	270.00
26) Partition Tile, Clay (4x12x12 in.)....per M.	150.00	110.00	....	....	138.00	100.00	230.00	....	75.00	140.00	140.00	300.00
27) Partition Tile, Gypsum (3x12x30 in.)....per ft.	....	.0975	....	.12	.16	....	.16	.18	....	....	.1525	.20
28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.12	....	.16	.17	....	.19	.19	....	....	.195	.21
29) Portland Cement, 4 sacks to bbl. (excluding sks.)....per bbl.	3.40	3.00	....	3.30	3.00	3.40	3.10	3.50	2.85	2.80	2.80	2.80
30) Extra charge for each cloth sk....per sk.	.10	.10	....	.10	.10	.10	.10	.10	.10	.10	.10	.10
31) Paving Block, vitrified (3½x4x8½ in.)....per M.	.....	50.00	....	....	75.00	....	....	55.00	....	45.00	51.00	55.00
32) Plaster Board, ⅜ in. thick....per M. sq. ft.	33.75	40.00	....	37.50	38.00	50.00	40.00	37.50	50.00	37.50	32.50	.25*
33) Sand (Building)....per ton	....	....	....	....	3.50	3.50	....	4.00	2.00*	3.00	2.10	2.60
34) Sand (Building)....per yd.	3.50*	2.50	....	....	....	3.00	2.30	....	....	....	2.50	2.75
35) Sewer Pipe, single strength, off list....per cent.	40%	45%	....	40%	39%	55%	38%	45%	50%	45%	45%	45%
36) Wall Coping, 9 in....per ft.	.25	.22	....	.28	.23	.18	.248	.22	.20	.26	.22	.28
37) Wall Coping, 13 in....per ft.	.36	.33	....	.42	.35	.27	.372	.33	.30	.38	.33	.42
38) Wall Plaster, neat, in paper, in 80-lb. bags....per ton	23.00	20.00	....	22.00	....	....	....	....	22.00	....	....	....
39) Wall Plaster, neat, in cloth, 100-lb. sacks, including sacks....per ton	23.00	19.00	....	22.00*	25.00*	25.00	22.50*	25.00	24.00*	24.00*	22.00	25.00
40) Wall Plaster, sanded, in cloth, 100-lb., including sacks....per ton	23.00	21.00	....	21.00*	22.00*	17.00*	17.50*	22.00	20.00*	17.40*	16.80*	20.00
41) Wall Plaster, wood fibre, in cloth, 100-lb., including sacks....per ton	23.00	19.00	....	22.00*	....	25.00*	22.50*	....	....	24.00*	....	28.00
42) Wall Ties, galvanized....per M.	5.00*	5.00	....	5.00	3.50*	3.50	6.00	5.00	4.50*	....	5.00	4.00
43) Wall Plugs....per M.	22.50	25.00	....	....	25.00	....	....	....	....	....	18.50	26.00
44) Asphalt Shingle (*singles; †stripped)....per sq.	6.50†	6.75†	....	7.50*	7.50†	9.00	8.00	7.00	7.00†	7.00*	7.45	7.50
45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	3.00**	2.75**	....	3.25*	3.00	....	....	2.75	4.00	3.00*	3.00*	....
46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	3.00§*	3.25§*	....	2.85§	2.90	....	....	....	....	1.50*	3.15§	....
47) Stucco Board, Medium wt....per M. sq. ft.	55.00	55.00*	....	....	55.00	70.00	....	55.00	55.00	45.00	....	....
48) Stucco Board, Narrow Key....per M. sq. ft.	....	....	....	60.00	68.00	75.00	65.00	60.00	60.00	50.00	....	70.00
LUMBER ITEMS												
49) Wood Lath, No. 1 (Size 4 ft.)....per M.	12.00	....	....	13.00	11.50*	....	....	12.00	12.00	11.50	11.50*	....
50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	46.00*	....	....	40.00	42.00	....	....	42.00	44.00	40.00	....	....
51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	....	45.00	60.00	....	....	....
52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	46.00*	....	....	40.00	42 00	....	....	40.00	43.00	45.00	....	....
53) 1x4 No. 2 Sheathing....per M. Board ft.	38.00	....	....	40.00	40.00	....	....	40.00	43 00	40.00	....	....
54) 1x4 "B" Flooring....per M. Board ft.	70.00	....	....	65.00	70.00	....	....	60.00	65.00	70.00	....	....
55) Yellow Pine Clear Finish....per M. Board ft.	100.00	....	....	100.00	95.00	....	....	90.00	100.00	95.00	....	....
56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	70.00	70.00	....	....	....	65.00	....	....	....
57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	50.00*	....	....	60.00	....	....	....	65.00	58.00	....	....	....
58) Cypress Finish Lumber....per M. Board ft.	120.00	....	....	....	....	....	....	.....	160.00	160.00	....	....
59) ¾x4 "B" Partition....per M. Board ft.	70.00	....	....	70.00	70.00	....	....	75.00	73.00	80.00	....	....
60) ½x4 "B" Ceiling....per M. Board ft.	60.00	....	....	60.00	58.00	....	....	55.00	58.00	....	....	....
61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	40.00*	....	....	60.00	56.00	....	....	....	75.00	....	....	....
62) Mouldings, Yellow Pine....over list	1.25	....	....	1.25*	....	....	....	....	1.10	1.00*	....	....
63) Washington 16 in., 5/2 Clears....per M.	....	....	....	6.50	7.50	....	....	8.00	7.00	6.50	....	....
64) Washington 16 in., 5/2 Clears....per sq.	....	....	....	5.20	....	....	....	....	6.50	....	....	....
65) Canadian 16 in., 5/2 xxxxx Clears....per M.	5.00*	....	....	7.50	....	....	....	....	....	....	....	....
66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	6.50	....	....	6.00	....	....	....	....	....	....	....	....
67) 1x6 in.-8 in.- 10 in. 12 in., No. 1 Com. Yellow Pine Boards....perM.	46.00*	....	....	....	60.00	....	....	60.00	60.00	....	....	....

(Above item 49)—No lumber revisions received for this issue from this city.

‡) Means no cloth bags used.

Lime (bulk, Item No. 1)—Reading, 80 lb. bu.; (Barreled, Item 2)—Newark includes bbls., returned at 10c; (Item 3), finishing, returned bags, 10c, Philadelphia, per bu.; (Item No. 3)—Newark, returned bags, 15c each.

Crushed Stone (4)—Pittsburgh, 1 in.

Common Brick (Item 6)—Philadelphia, f. o. b. job. mfrs. retail price.

Flue Lining (Items No. 10, 11) Erie, (10) 8x8 in., (11) 8x12 in.

Fire Clay (Item 13)—Return bags, Elmira, 15c; Jamestown, none; Pittsburgh, paper sacks, $2.00 extra per ton, in cloth sacks. with no allowance for returned sacks. No credit for returned sacks. Scranton, returned sks., 25c.

Gravel (Item No. 14)—Philadelphia; Scranton, 2400 lb. yd.; Elmira, 2500 lb. yd.; 2000 lb. ton, Reading; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Hollow Building Tile (Item 15-16)—Rochester, (Item 15) 4 cell; (Item 16) 6 cell.

Hair (19)—Lbs. per bu., Pittsburgh, Elmira, 4; Scranton, 7; price per lb., Erie; old stock, Rochester, Pittsburgh, fibre; Allentown Govt. Paterson, per lb.

Plaster Board (Item 32) Paterson, price for each.

Sand (Item 34)—Elmira, 2600 lb. yd.; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Wall Plaster (Items 39, 40, 41)—Returned sacks, 15c, Jamestown. Allentown, Scranton, Pittsburgh, Philadelphia, 20c, Erie; Newark, 15c credit for returned sacks.

Wall Ties (Item 42)—Corrugated. Allentown, Elmira; per box, Pittsburgh.

Roofing, Slate Surf. (Item 45)—70 lbs., Elmira; 75 lbs., Rochester.

Roofing, Smooth Surf. (Item 46)—55 lbs., Elmira, Rochester.

Stucco Board (Item 47)—Rochester, Sheetrock.

(Item 49)—Newark, spruce; Allentown $11.50 to $12.50.

(Item 50)—Elmira, 12 ft. and less, No. 2 Com.

(Item 52)—Elmira, No. 2 Com.

(Item 57)—Elmira, No. 2.

(Item 61)—Elmira, fir; (Item 62)—Jamestown, per 1½ inches; Scranton, per 100 lin. ft., moulding count; (Item 65)—Elmira, 6/2 Star, per sq.; (Item 67)—Elmira, 1 in., 10 in., No. 2 Com.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. MIDDLE AND SOUTHERN ATLANTIC STATES

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Trenton, N. J.	Wilmington, Del.	Washington, D. C.	Baltimore, Md.	Norfolk, Va.	Richmond, Va.	Huntington, W. Va.	Fairmont, W. Va.	Wheeling	Atlanta, Ga.
(1) Bulk Lime	per cwt.	$0.60*	$0.79	$0.80	$ 0.51*	....	....	....	....	....	$1.88*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	*	2.80	2.50	2.50	$2.50	$2.30	$2.80	$2.50	$2.75	2.25
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	*	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	2.90	....	....	3.00	3.75	....	5.00	5.00	....
(5) Crushed Stone	per yd.	....	3.85	....	....	....	....	....	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	16.00	22.00	22.00	21.00*	17.00	20.00	18.75	28.00	22.00	12.50*
(7) Corner Bead, galvanized	per ft.	06	.04	.04	.05	.05	06	.07	.04	.05	.065
(8) Drain Tile, 4 in.	per ft.	....	.10	.08	.07	.08	.08	.075	.06	.06	.09
(9) Drain Tile, 6 in.	per ft.	....	....	.11	.14	.12	.125	.12	.10	.09	.11
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	....	.36	.25	.30	.30	.33	.30	.27	.30	.45
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.58	.54	.40	.45	.45	.495	.45	.405	.45	.60
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	....	75.00	85.00	75.00	80.00	85.00	60.00	60.00	65.00	60.00
(13) Fire Clay, in 100- lb. cloth bags, inc. bags	per ton	....	21.00	25.00*	18.00	20.00	20.00*	15.00*	14.00*	11.50*	20.00*
(14) Gravel, washed	per yd.	2 50*	2 80	2.25*	2.50	4.00	4.00	3.00	3.75	2.00*	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	210.00*	200.00	250.00	247.50*	....	....	200 00	210.00*	190.00	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	....	90.00	130.00	....	160.00	....	85.00	85.00	80.00	87.60*
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.475	.45	.45	.375	20.00*	18.50*	21 00*	.375	.55	1.90*
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.65	.70	.57	.50	22.50*	23.50*	22.00*	.475	.55	2.75
(19) Hair	per bu.	.45	.42	.50	.50	.60	.50	.50	.12*	.75	1.00*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.38	.36	.32	.355	.30	.35	.38	.34	.35	.40
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	.37	.32	.43	.305*	....	.35*	35	....	.38	.345
(22) Mortar Color, red	per lb.	.04	.04	.06	.035	.05	.04	.0275	.0265	.035	.0225
(23) Mortar Color, buff	per lb.	.04	.04	.07	.035	.05	.06	.03	.037	.035	....
(24) Mortar Color, double strength black	per lb.	.10	.12	.10	.06	.10	.065	.05	....	.04	.04
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	120.00	110.00	125.00*	180.00	140.00	100.00	....	85.00	....
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	130.00	110.00	132.50*	180.00	150.00	115.00	100.00	90.00	....
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	.15	.15	.15	.15	....	.18	.15	....	....	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.18	.19	.17	.18	....	.20	.17	....	....	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.40	3.20	3.00	2.87	3.50	3.15	3.25	2.90	2.60	3.45
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.10	.07	.075	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	65.00*	40.00	....	....	....	60.00	32.00*	....	....	....
(32) Plaster Board, ⅜ in. thick	Per M. sq. ft.	.30*	35.00	27.00	37.00	....	40.00	40.00	35.00	35.00	....
(33) Sand (Building)	per ton	2.00	2.35	1.55	....	2.00	2.75	....	3.00	2.20	....
(34) Sand (Building)	per yd.	....	2.80	2.00	....	2.50	3.00	2.25	....	....	....
(35) Sewer Pipe, single strength, off list	per cent.	40%	40%	25%	50%	50%	50%	50%	55%	55%	51%
(36) Wall Coping, 9 in.	per ft.	.26	.24	.24	.26	.22	.22	.20	.20	.20	.35
(37) Wall Coping, 13 in.	per ft.	.39	.36	.36	.39	.33	.33	.30	.30	.30	.45
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	22.00	20.00	....	....	....	24.00	22.00*	....	21.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks.	per ton	....	23.50	22.50*	20.25	22.50*	23 00*	24.00*	21.00*	23.00*	25.00*
(40) Wall Plaster, sanded, in cloth 100 lb. sks., inc. sks.	per ton	....	20.00	23.00*	....	22.50*	23 00*	24.00*	....	16.00	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. sks., inc. sks.	per ton	....	23.50	23.00*	....	22.50*	23.00*	24.00*	21.00*	23.00*	....
(42) Wall Ties, galvanized	per M.	4.50	5.00	5.00	5.00	5.00	5.00	4 00	3 50	5.00	3.75
(43) Wall Plugs	per M.	....	25 00	28.00	25.00	....	....	20 00	....	16.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	8.00†	8 50	7.50	5.70†	....	....	7.50*	7.00*	7.50*	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.25*	3.00	3 00†*	2.60**	....	....	3.25*	2.75†*	2.75**	2.75§
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.75†	2.80	2.90§*	2.65§	....	....	2.75§	3.00§*	2.80§*	2.70§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	....	75.00	....	60.00	65.00	....	55.00*	45.00	.. .
(48) Stucco Board, Narrow Key	per M. sq. ft.	65.00	68.00	....	....	....	....	....	....	....	....
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	12.00*	12.00*	....	13.00	....	6.00	8.50	....	....	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	....	40.00	....	....	....	....	38.00	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	....	....	....	50.00	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	42.50	....	....	....	....	38.00	....	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	....	....	....	....	....	....	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	....	70.00	....	....	....	....	58 00	....	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	....	75.00	....	....	....	....	70.00	....	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	70.00	....	....	....	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	....	....	48.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	145.00	....	....	....	....	160.00	....	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	75.00	....	....	....	....	65.00	....	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	....	50.00	....	....	....	....	55.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	65.00	....	....	....	....	....	....	....	....
(62) Mouldings, Yellow Pine	over list	....	1.00	....	....	....	....	1.00	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	....	6.50*	....	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	7.50	....	....	....	....	8.00*	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	6.50	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.- 10 in. 12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	....	....	....	....	58.50	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags.

Lime (bulk, Item No. 1)—Baltimore, per bu.; Atlanta, bbl. of 3 sacks; Trenton, 70 lb. bu. (Barreled) Trenton, not handled locally, supply from Philadelphia. **Hydrated** (Items 17, 18)—Ton lot price, Richmond, Norfolk, Huntington; Atlanta, barrel price.

Common Brick (6)—Baltimore, f. o. b. job, mfrs. ret. price. Atlanta, f. o. b. Atlanta.

Fire Clay (13)—Washington, Atlanta, no credit for sacks; Wheeling, 15c credit for sacks; Fairmont, Huntington, 10c credit for sacks; bulk only, Richmond.

Gravel (14)—Washington, 2,700 lb. yd.; ton price only, Trenton, Wheeling, Washington.

Hollow Bldg. Tile (Item 16)—Atlanta, back up tile, 3 cell, car-load price; Trenton, Baltimore, Fairmont, load bearing.

Hair (19)—Bu. of 4 lb., Atlanta; Fairmont, per lb.

Metal Lath (Item 21)—Richmond, Baltimore, Gauge No. 27.

Partition Tile (25, 26)—Baltimore, little demand.

Paving Block (31)—Huntington, culls; Trenton, known as paving brick.

Plaster Board (Item 32)—Trenton, price for each.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c credit, Washington, Wheeling, Huntington, Atlanta, Fairmont; sacks 14½c credit, Richmond; returned sacks, 10c, Norfolk.

Roofing, Slate Surf. (Item 45)—80 lb., Washington, Baltimore; 85 lb., Fairmont; Wheeling, 85 lbs.

Roofing, Smooth Surf. (Item 46)—55 lb., Washington, Fairmont; Wheeling, rolls, 55 lbs.

Stucco Board (Item 48)—Creosoted, Fairmont.

(Item 49)—Spruce, Trenton, Wilmington.

(Item 63)—Huntington, Stars.

(Item 65)—Huntington, XAXRQ

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

SOUTHERN AND SOUTHWESTERN STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Miami, Fla.	Tampa, Fla.	St. Petersburg	Louisville	Lexington	Memphis, Tenn.	Nashville, Tenn.	Birmingham,★ Ala.	New Orleans, La.	El Paso, Tex.	Houston
(1) Bulk Lime.......per cwt.	....	....	....	$0.70	$0.65*	1.30*	$0.57*	....	$0.75	$0.625	$0.95*
(2) Barreled Lime, 180 lbs. (net) bbls.......per bbl.	$3.30	2.25	$2.75	$2.35*	2.50	$2.00	2.35	....	1.88	2.25	2.75
(3) Barreled Lime, 280 lbs. (net) bbls.......per bbl.	....	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone.......per ton	....	....	....	....	3.25	....	....	....	....	1.25	....
(5) Crushed Stone.......per yd.	2.75	7.00	5.75	....	....	2.50*	3.15	....	....	....	3.75
(6) Common Brick, standard quality and sizes (8x2¼x3¾)per M.	25.50	18.00*	17.00	18.00	18.00	14.50	18.00	....	15.00*	16.00	18.00*
(7) Corner Bead, galvanized.......per ft.	.06	.05	.07	.05	.06	.06	.05	....	.07	.05	.045
(8) Drain Tile, 4 in.......per ft.	.10	....	....	.045	.08	.055	.08	....	.075	....	.13
(9) Drain Tile, 6 in.......per ft.	....	....	....	.084	.12	.09	.14	....	.12	....	.18
(10) Flue Lining, 8½ in x 8½ in.......per ft.	.40	.40	.45	.27	.39	.34	.30	....	.30	....	.44
(11) Flue Lining, 8½ in. x 13 in.......per ft.	.60	.50	.55	.405	.58	.51	.45	....	.42	....	.65
(12) Fire Brick, Standard 9-in. No. 1 clay.......per M.	85.00	80.00*	70.00	70.00	70.00	62.00	63.00	....	56.40	90.00*	65.00
(13) Fire Clay, in 100-lb. cloth bags, including bags.......per ton	40.00*	20.00	40.00	15.00*	20.00	16.00*	23.00*	....	14.10	....	17.50*
(14) Gravel, washed.......per yd.	....	....	....	....	3.65	3.25*	2.25	....	3.05	....	3.50
(15) Hollow Building Tile (8x12x12 in).......per M.	280.00	280.00	230.00	208.40	165.00	180.00	246.30*	....	220.00	240.00	236.60*
(16) Hollow Building Tile (8x5x12 in).......per M.	180.00	120.00	120.00	92.60	80.00*	90.00	109.50	....	....	90.00	93.10*
(17) Hydrated Lime (masons) in 50-lb. paper bags.......per bag	.75	.60*	.75	.50	.75	.50	.50	....	.41	.60	.50*
(18) Hydrated Lime (finishing) in 50-lb. paper bags.......per bag	.85	.75*	.80	.65	.75	.60	.65	....	.58	....	.50*
(19) Hair.......per bu.	1.00	.75	.75	75	....	.60	.55	....	.56	....	85
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡. .per yd.	.38*	.45	....	.45	.35	.31	.40	....	.38	.37	.371
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.......per yd.	.38*	.31*	....	....	.35	....	....	....	.38	.40*	....
(22) Mortar Color, red.......per lb.	.055	.04	.04	.035	.03	.02	.05	....	.05	.035*	.0325
(23) Mortar Color, buff.......per lb.	.06	.04	.06	.045	....	.03	.08	....	.05	.0375*	.04
(24) Mortar Color, double strength black.......per lb.	.08	.07	.06	.06	....	.045	.16	....	.06	.045*	.0475
(25) Partition Tile, Clay (3x12x12 in.).......per M.	....	....	....	92.60	85.00	110.00	109.50	....	126.90	120.00	115.30*
(26) Partition Tile, Clay (4x12x12 in.).......per M.	....	....	150.00	104.20	88.00	120.00	123.20	....	131.60	120.00	127.70*
(27) Partition Tile, Gypsum (3x12x30 in.).......per ft.	....	....	....	....	....	....	.1375	....	.12	.125	.13
(28) Partition Tile, Gypsum (4x12x30 in.).......per ft.	....	....	....	....	....	....	.165	....	....	....	.165
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)per bbl.	4.12	3.20	3.60	2.70	....	3.11	3.80	....	2.98	3.60	3.35
(30) Extra charge for each cloth sk.......per sk.	.07	.10	.05	.10	....	.10	.10	....	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.).......per M.	....	....	....	....	....	....	....	....	40.40	....	....
(32) Plaster Board, ⅜ in. thick.......per M. sq. ft.	60.00*	40.00	41.00	50.00	65.00	47.50*	44.00	....	41.36	....	60.00
(33) Sand (Building).......per ton	....	....	1.00	....	3.75	....	....	....	....	1.75	1.75
(34) Sand (Building).......per yd.	1.60	3.50	1.40	....	4.50	2.17	3.00	....	1.88	1.75	1.75
(35) Sewer Pipe, single strength, off list.......per cent.	*	30%*	35%	55%	45%	....	50%	....	*	....	*
(36) Wall Coping, 9 in.......per ft.	....	...	....	55%	45%	.23	.20	....	.16	....	.31
(37) WallCoping, 13 in.......per ft.	....	....	....	55%	45%	.32	.30	....	.23	....	.44
(38) Wall Plaster, neat, in paper, in 80-lb. bags.......per ton	....	22.00	....	....	....	....	....	....	....	16.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. sks., inc. sks.......per ton	29.00	24.00	25.50	25.00	27.00	24.00*	27.00	....	22.36	18.00*	25.00*
(40) Wall Plaster, sanded, in cloth, 100-lb., inc. sks.......per ton	....	....	....	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloth, 100-lb., inc. sks.......per ton	29.00*	24.00	25.50	25.00	....	24.00*	....	....	....	18.00*	....
(42) Wall Ties, galvanized.......per M.	5.00	4.00	5 00	4.00*	4.50	4.50	5.00	....	4 75	4.00*	5.25*
(43) Wall Plugs.......per M.	....	....	....	30.00	....	18.50	22.50	....	....	....	30.00
(44) Asphalt Shingle (*singles; †stripped).......per sq.	10.00	8.00*	8.00†	6.25	....	7.00*	7.50*	....	7.00	....	9.00
(45) Roofing Slate Surf. (*heavy, †extra heavy).......per sq.	4.00**	3.25	3.50†	3.00†	4.00*	2.60†	3.00†*	....	3.00	4.00*	4.00**
(46) Roofing Smooth Surf. (*light, †medium, §heavy).......per sq.	3.50§	3.50§	3.25§	3.25†	3.75§	2.85§	2.85§*	....	2.50	4.00§	3.50§*
(47) Stucco Board, Medium wt.......per M. sq. ft.	....	65.00*	....	60.00	....	....	....	....	....	....	....
(48) Stucco Board, Narrow Key.......per M. sq. ft.	....	9.50*	....	....	....	....	....	....	....	....	....
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.).......per M.	10.00	9.00*	8.75*	....	5.50	.....	7.00	....	5.00*	....	.....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.......per M. Board ft.	.....	32.00	....	....	35.00	.....	37.50	.....	32.00	45.00	35.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths.......per M. Board ft.	.....	60.00	....	....	45.00	....	50.00	.....	48.00	.....	.....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths.......per M. Board ft.	.....	35.00	....	....	35.00	.....	35.00	.....	36.00	.....	.....
(53) 1x4 No. 2 Sheathing.......per M. Board ft.	.....	30.00	....	....	30.00	.....	30.00	.....	26.00	.....	22.50
(54) 1x4 "B" Flooring.......per M. Board ft.	.....	55.00	....	....	55.00	.....	50.00	.....	42.00	.....	.....
(55) Yellow Pine Clear Finish.......per M. Board ft.	.....	80.00	....	....	80.00	.....	75.00	.....	60.00	.....	.....
(56) 1x6 "B&Btr" Drop Siding.......per M. Board ft.	.....	55.00	....	....	....	....	60.00	.....	63.00	....	.....
(57) 1x6 No. 1 Common Drop Siding.......per M Board. ft.	.....	45.00	....	....	....	....	50.00	.....	43.00	....	.....
(58) Cypress Finish Lumber.......per M. Board ft.	......	150.00	....	....	150.00	.....	150.00	....	160.00	....	.....
(59) ¾x4 "B" Partition.......per M. Board ft.	.....	60.00	....	....	60.00	.....	55.00	.....	50.00*	70.00	.....
(60) ½x4 "B" Ceiling.......per M. Board ft.	.....	50.00	....	....	52.50	.....	50.00	.....	50.00	....	.....
(61) ½x5 Clear Rdwd. Bevel Siding.......per M. Board ft.	.....	80.00	....	....	....	....	65 00	.....	....	....	.....
(62) Mouldings, Yellow Pine.......over list	....	1.25	....	....	10%	....	10%	....	....	....	10%
(63) Washington 16 in., 5/2 Clears.......per M.	....	....	....	....	5.50	7.50	6.50	....	....	....	6.50
(64) Washington 16 in., 5/2 Clears.......per sq.	....	....	....	....	....	....	....	....	....	....	5.20
(65) Canadian 16 in., 5/2 xxxxx Clears.......per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears.......per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Yellow Pine Boards...per M	.....	60.00*	....	....	....	....	55.00	.....	54.00	....	45.00*

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime (Item No. 1, bulk)—Nashville, 80 lb. bu. Lexington, 70 lbs., Houston c/L f. o. b. Houston, Memphis, f. o. b. cars. **Barreled Lime**, (Item 2 and 3), Louisville, blue river lime. **Hydrated** (Items 17, 18)—Tampa, 40 lb. bags, Florida lime, 60c; Houston, 40 lb. bags.

Crushed Stone (Item 4-5)—Memphis, f. o. b. cars, per ton.

Common Brick (Item 6)—Tampa, Ala. and Ga. red; New Orleans, another quotes $14.57; Houston, another quotes $21.50.

Fire Brick (Item 12)—Carload lots, El Paso; Tampa. $60.00 to $80.00.

Fire Clay (Item 13)—15c credit, Nashville; no credit, Louisville, Birmingham, Houston, Miami, Memphis.

Gravel (Item 14)—Memphis, concrete.

Hollow Building Tile (15, 16)—Houston, Interlocking tile, $134.00 per M; Lexington, f. o. b. cars; Nashville, load bearing; Houston, car loads.

Metal Lath (Item 21)—El Paso, Gauge No. 27: Miami, Gauge 26, galvanized per sq. yd.; (Item 20)—Blk. Painted Exp. Key Lath, Gauge 27, El Paso; Tampa, Gauge 27.

Mortar Color (Item 22, 23, 24)—El Paso, barreled lot price.

Partition Tile Clay (Items 25, 26)—Houston, mfrs. price.

Plaster Board (Item 32)—Miami, Memphis, ¼ inch.

Sewer Pipe (Item 35)—Houston various per cent. off list; New Orleans, Miami, list; Tampa, less.

Wall Plaster (38, 39, 40, 41)—15c sacks, Birmingham, El Paso, Memphis, Miami; hair fibre. Houston, gross ton, 15c sacks.

Wall Ties (42)—Corrugated, El Paso, Louisville, Houston.

Roofing, Slate Surf. (Item 45)—85 lbs. Miami, Nashville, Houston.

Roofing, Smooth Surf. (Item 46)—55 lbs., Nashville, Houston.

Stucco Board (Item 47-48)—Tampa, creosoted.

(Item 49)—Tampa, St. Petersburg, cypress; New Orleans, another quotes $6.50. **(Item 59)**—New Orleans, another quotes $60.00. **(Item 67)**—Houston, 12 inches, $45.00, 6 to 10 inches, $35.00; Tampa, $60.00 to $80.00.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

SOUTHWESTERN AND CENTRAL STATES

Item	Unit	Dallas, Tex.	Topeka, ★ Kan.	Little Rock, Ark.	Okla. City Okla.	Cincinnati, O.	Cleveland	Columbus	Toledo	Detroit, Mich.	Evansville, Ind.
(1) Bulk Lime	per cwt.	....	....	....	$1.10	$0.95	$1.10	$0.50	$0.95	$0.85	$0.90
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$2.75	$3.25	$2.75	2.75	2.50	3.45	2.50	....	....	2.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	....	....	....	3.10	2.90*	3.60	3.00*	3.50	2.50	....
(5) Crushed Stone	per yd.	....	....	....	....	....	4.50	...	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	20.00	35.00	12.50*	18.00	18.00*	15.00	16.50	15.50	16.85	14.00
(7) Corner Bead, galvanized	per ft.	.475	....	.06	.06	.06	.06	.05	.04	.03	.04
(8) Drain Tile, 4 in.	per ft.	.07	.065	.10	....	.055	.047	.05	.06	.06	.03
(9) Drain Tile, 6 in.	per ft.	.20	.11	.15	....	.09	.076	.08	.089	.12	.045
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.45	.55	.55	.40	.27	65%*	.24	52%*	.27	.32
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.65	.80	.70	.55	.405	65%*	.36	52%*	.405	.48
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	72.05	....	80.00	60.00	57.00	50.00	60.00	50.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	19.20	....	25.00*	18.00	.73‡*	12.00*	.70*	11.00	10.00	15.00
(14) Gravel, washed	per yd.	....	....	....	3.10*	2.75*	....	1.25*	3.50*	3.40	1.80
(15) Hollow Building Tile (8x12x12 in.)	per M.	210.00	300.00	....	....	170.00	134.00	174.10	....	186.60	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	90.00*	115.00	....	93.00	68.00	58.00	....	75.00	79 00	65.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.60*	.65	.6875	.60	.45	.37	.35	.45	.40	.60
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.50*	....	.75	.60	.49	.40	.40	.45	.45	.60
(19) Hair	per bu.	.75	....	.75	....	.55	.75	.65	.75	.20*	.60
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.362	.40	.42	.35	.35	.40	.36	.36	.34	.32
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	....	....	....	....	....	....	....	.40	....	.28
(22) Mortar Color, red	per lb.	.04*	.06	.03	.03	.025	.0215	.025	.04	.03	.026
(23) Mortar Color, buff	per lb.	.04*	.06	.045	.04	.036	.0315	.03	04	.05	.03
(24) Mortar Color, double strength black	per lb.	.095	....	.05	.07	.065	.049	.05	.05	.06	.055
(25) Partition Tile, Clay (3x12x12 in.)	per M.	112.00	130.00	140.00	....	90.00	61.00	86.35	*	97.70	77.50
(26) Partition Tile, Clay (4x12x12 in.)	per M.	124.00*	....	160.00	....	100.00	68.00	92.90	*	97.70	80.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	.13	....	....	....	.17	.17	.135	*	.16	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.1525	....	....	....	.18	.21	.18	*	.185	....
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	3.20	3.40	4.00	3.10	3.28	2.80	3.00	3.28	3.00	2.80
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.10	.10	.10	.10	.10	.08	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	....	....	....	40.00	45.00*	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	65.00*	45.00	35.00	45.00	50.00	33.75	37.50	.29*	31.00	40.00
(33) Sand (Building)	per ton	....	....	....	2.20	2.25*	2.75	3.50	2.25	3.40	....
(34) Sand (Building)	per yd.	4.00	....	1.00*	....	2.30*	....	3.50	....	....	1.80
(35) Sewer Pipe, single strength, off list	per cent.	20%	....	....	....	50%	60%	60%	52%	50%	50%
(36) Wall Coping, 9 in.	per ft.	.30	....	.35	.37	.20	60%*	50%*	52%*	45%*	.22
(37) Wall Coping, 13 in.	per ft.	.45	....	.45	.40	.30	60%*	50%*	52%*	45%*	.32
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	....	....	20.00	23.25	18.00	17.00	....	18.75	....
(39) Wall Plaster, neat, in cloth, 100 lb. sacks, including sacks	per ton	21.00	21.00	27.00*	20.00	25.00	20.00*	....	....	19.00*	23.00
(40) Wall Plaster, sanded, in cloth, 100 lb., including sacks	per ton	....	....	....	....	....	12.50	16.00*	11.40*	13.00*	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb., including sacks	per ton	21.50	....	27.50*	20.50	25.00	20.00	....	14.00‡	19.00*	23.00
(42) Wall Ties galvanized	per M.	4.00	....	4.75	4.00	4.75	3.60	2.50	3.00	3.00	2.50
(43) Wall Plugs	per M.	22.50	....	25.00	30.00	....	....	....	15.00	....	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	10.00	8.50	8.50*	7.00*	8.50*	5.75*	7.00†	6.50†	5.50†	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	4.50*	4.00**	3.40†	3.00†	....	2.85†	3.00†	2.75†	3.00**	2.75
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	4.25§	4.00§	3.00§	2.50§	....	2.90§	2.10†	2.75§	2.40§*	2.75§*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	....	....	....	....	55.00	60.00	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	....	....	....	55.00	70.00	55.00	60.00	....
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	....	....	6.50	....	7.75	13.00*	9.50*	11.50	....	7.50*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	....	....	....	....	....	49.00	40.00	40.00	....	40.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	....	....	49.00*	....	....	....	50.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	....	....	42.00*	42.50	35.00	....	37.50
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	....	....	....	49.00	37.50	32.00	....	35.00
(54) 1x4 "B" Flooring	per M. Board ft.	....	....	....	....	....	85.00*	65.00	63.00	....	60.00
(55) Yellow Pine Clear Finish	per M. Board ft.	....	....	....	....	....	97.50	90.00	85.00	....	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	....	....	73.50	60.00	....	....	65.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	....	66.25	50.00	52.00	....	50.00
(58) Cypress Finish Lumber	per M. Board ft.	....	....	....	....	....	128.25	140.00	135.00	....	150.00
(59) ¾x4 "B" Partition	per M. Board ft.	....	....	....	....	....	97.50	65.00	55.00*	....	75.00
(60) ½x4 "B" Ceiling	per M. Board ft.	....	....	....	....	....	66.25*	50.00	50.00	....	50.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	....	....	....	66.25	55.00	55.00	....	60.00
(62) Mouldings, Yellow Pine	over list	....	....	....	....	....	1.35*	1.10	1.10*	....	25%
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	7.95	6.50	6.00	....	5.75
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	4.80
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	....	....	....	66.25	60.00	60.00	....	50.00

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime, Hydrated (Item 17, 18)—Dallas, 40 lb. bags.

Crushed Stone (4)—Columbus, f. o. b. tipple stone at quarries; Cincinnati, bowlders.

Common Brick (6)—Little Rock, Cincinnati, f. o. b. cars.

Flue Lining (10, 11)—Per cent. off list, Toledo, Cleveland.

Fire Clay (Item 13)—Cincinnati, Cleveland, paper; Columbus, price per sack, 10c; single sack rate, no credit on returned sacks, Little Rock.

Gravel (14)—Columbus, tipple, per ton; Cincinnati, Okla. City, per ton; Toledo, Roofing Gravel, per ton.

Hollow Building Tile (Item 15-16)—Dallas (Item 16), Interlocking Tile, $125.00 per M.

Hair (19)—Detroit, per lb.;

Mortar Colors (Items 22-23-24) Dallas paste.

Partition Tile, Clay (25, 26)—Dallas, mfrs. price; Toledo, price quoted on request.

Paving Block (Item 31)—Toledo No. 2 quality.

Plaster Board (Item 32)—Per sheet, 32x36 ft., ⅜ in. thick, Toledo; Dallas, sheetrock.

Sand (33, 34)—Cincinnati (33) concrete and (34) fine; Little Rock, f. o. b. yard.

Wall Coping (36, 37)—Per cent. off list, Toledo, Detroit, Columbus, Cleveland.

Wall Plaster (39, 40, 41)—Returned sacks, 15c, Cleveland, Little Rock; sacks, 12c each, Detroit; Columbus, 80 lb. paper; Toledo, 8c sacks.

Roofing, Slate Surf. (Item 45)—85 lbs., Topeka; 80 lbs. Detroit.

Roofing, Smooth Surf. (Item 46)—55 lbs., Detroit, Evansville.

(Item 49)—Cleveland, white pine; Evansville, pine; Columbus, chestnut, (Item 51)—Cleveland, No. 2 Commercial; (Item 52)—Cleveland, No. 3; (Item 54)—Cleveland, No. 1 C.; (Item 59)—Toledo, Select Com. Cypress D4S; (Item 60)—Cleveland, ⅜ in.; (Item 62)—Cleveland, Toledo, per 100 inches.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

		INDIANA				ILLINOIS			
Item	Unit	Ft. Wayne††	Indianapolis	South Bend	Terre Haute	Bloomington, Ill.	Chicago	Moline	Peoria
(1) Bulk Lime	per cwt.	$0.90*	$0.83	$1.75	....	....	$1.40*	$0.80	.. .
(2) Barreled Lime, 180 lbs. (net) bbls.	per bbl.	....	....	3.25	....	$2.75	2.40	1.80	$2.75
(3) Barreled Lime, 280 lbs. (net) bbls.	per bbl.	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	5.00	....	$3.00	4.00	....	....	....
(5) Crushed Stone	per yd.	....	5.63	....	....	....	2.75	3.75	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	18.00	18.50*	20.00	18.00	22.00	....	18.00	15.50
(7) Corner Bead, galvanized	per ft.	.06	.05	.06	.06	.06	.04	.06	....
(8) Drain Tile, 4 in.	per ft.	.05	.05	....	....	.05	....	.085	.0697
(9) Drain Tile, 6 in.	per ft.	.07	.12	.04	....	.09	....	.12	.12
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.36	.65	.33	.325	.35	....	.40	.40
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.54	1.00	.495	.50	.55	....	.45	.50
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	70.00	65.00	55.00	60.00	75.00	80.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	13.00*	10.50	15.00*	15.00*	20.00*	22.00*	12.00	15.00
(14) Gravel, washed	per yd.	....	....	2.15	3.00*	4.45*	2.75	3.15	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	....	157.75	240.00	....	....	150.00	....	126.00
(16) Hollow Building Tile (5x8x12 in.)	per M.	80.00	67.50	115.00	....	100.00	75.00	70.00	59.00
(17) Hydrated Lime (masons) in 50-lb. paper bags	per bag	.65	.42	....	.50	.65‡	.425	.525	.50
(18) Hydrated Lime (finishing) in 50-lb. paper bags	per bag	.65	.50	....	.60	.65‡	.45	.60	.57
(19) Hair	per bu.	.80	.60	.75	....	....	.45	.80	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.44	.36	.40	.40	....	.30	.35	....
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	42*	....	.36	.30	.35	.29	.34	....
(22) Mortar Color, red	per lb.	.03*	.025*	.05	.04	.05	.05*	.05	.03
(23) Mortar Color, buff	per lb.	.04*	.035*	.05	.04	.05	.05*	.055	.04
(24) Mortar Color, double strength black	per lb.	.06*	.055*	.06	.05	.07	.05*	.07	.06
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	74.50	80.00	....	....	75.00	....	....
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	95.00	85.00	....	....	80.00	....	72.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	.153	....	....	....	.125	.14	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	.191	....	....	....	.14	.16	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.40*	3.40	3.20	3.00	3.20	2.45	2.80	3.20
(30) Extra charge for each cloth sk.	per sk.	....	.07	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	50.00	....	50.00	....	....	....	36.00	35.50*
(32) Plaster Board, ⅜-in. thick	per M. sq. ft.	50.00*	40.00	35.00	45.00	45.00	30.00	45.00	50.00
(33) Sand (building)	per ton	3.00*	5.00	....	....	3.50	....	....	....
(34) Sand (building)	per yd.	....	3.00	2.15	3.00*	4.00*	2.50	2.05	....
(35) Sewer Pipe, single strength, off list	per cent.	40%	45%	45%	55%	40%	....	42%	20%
(36) Wall Coping, 9 in.	per ft.	.26	.25	.22	55%*	.25	.18*	.27	.25
(37) Wall Coping, 13 in.	per ft.	.39	.40	.33	55%*	.35	.27*	.36	.35
(38) Wall Plaster, neat, in paper, in 80-lb. bags	per ton	22.50	21.25	21.00	20.00	20.00	....	19.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. incl. sks.	per ton	....	23.00‡	23.00‡	23.00	23.00*	18.00*	21.00	22.70
(40) Wall Plaster, sanded, in cloth, 100-lb. incl. sks.	per ton	....	12.00‡	....	....	23.00	15.00	....	16.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb. incl. sks.	per ton	23.75*	22.50‡	21.25‡	23.00	23.00*	18.50*	20.00	22.70
(42) Wall Ties, galvanized	per M.	4.75	3.00	3.75	3.50	5.00	3.25	3.75	4.00
(43) Wall Plugs	per M.	25.00	15.00	25.00	....	10.00	23.00	23.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	7.00†	8.00	7.00†	7.00*	8.00*	6.75*	7.50	7.50*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.25†	3.25*	3.00†	3.50*	3.75**	2.75	3.50*	3.25†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.00§	3.25§	2.75†	3.00§	3.50**	.....	3.25§	2.75§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	50.00	55.00	60.00	55.00	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	60.00	....	....	60.00	....	....
LUMBER ITEMS									
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	8.00*	11.25	12.50	....	....	....	....	14.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	....	....	45.00	....	....	....	....	49.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	65.00	....	....	....	....	51.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	45.00	....	....	....	....	46.00
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	42.50	....	....	....	....	46.00
(54) 1x4 "B" Flooring	per M. Board ft.	....	....	70.00*	....	....	....	....	78.00
(55) Yellow Pine Clear Finish	per M. Board ft.	....	....	110.00*	....	....	....	....	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	....	....	....	....	70.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	65.00	....	....	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	....	150.00	....	....	....	....	150.00
(59) ¾x4 "B" Partition	per M. Board ft.	....	....	85.00	....	....	....	....	79.00
(60) ½x4 "B" Ceiling	per M. Board ft.	....	....	60.00	....	....	....	....	69.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	60.00	....	....	....	....	74.00
(62) Mouldings, Yellow Pine	over list	....	....	....	....	....	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	6.50	....	....	....	....	7.00
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	6.75	....	....	....	....	7.00
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq	....	....	7.00	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	65.00	....	....	....	....	60 00*

††Ft. Wayne—5% discount to contractors and manufacturers for payment on or before 10th of month following purchase, except shingles, roofing and common brick, on which regular 2% discount will be allowed.

*(Above Item 49)—No lumber revisions received for this issue from this city.

‡Means no cloth bags used.

Lime (bulk, Item 1) — Ft. Wayne, Ground, 75 lb. paper sks.; per bbl., 200 lb., Chicago.

Common Brick (Item 6)—Indianapolis, another quotes at $16.00.

Fire Clay (13)—Returned sacks 15c, South Bend, Bloomington; sacks 25c, Ft. Wayne; paper sacks, Chicago; paper sacks, Terre Haute.

Gravel (14)—Terre Haute, 3000 lb. yd.; Bloomington, 2500 lb. yd.

Metal Lath (Item 21)—Ft. Wayne, Gauge 26.

Mortar Color (22, 23, 24)—Ft. Wayne, in 100 lb. sacks, broken 1c more; Indianapolis, Chicago, 100 lb. lots.

Portland Cement (Item 29)—Ft. Wayne, in paper sks.

Paving Block (Item 31)—Peoria, 3x4x8½ in.

Plaster Board (Item 32)—Ft. Wayne, Wall Board.

Sand (33, 34)—Terre Haute, 2600 lb. yd.; Bloomington, 2500 lb. yd.; Ft. Wayne, washed.

Wall Coping (36, 37)—Per cent. off list, Terre Haute; Chicago, double slant.

Wall Plaster (38, 39, 40, 41)—Returned sacks, 15c, Bloomington, Chicago; Fort Wayne, paper.

Roofing, Slate Surf. (Item 45)—85 lbs., Bloomington.

Roofing, Smooth Surf. (Item 46)—60 lbs., Bloomington.

(Item 49)—Peoria, cypress; Ft. Wayne, yellow pine; (Item 54)—South Bend "B & Btr." (Item 55)—South Bend, Rough. (Item 67)—Peoria, 6, 8, and 10 in., $51.00; 12 in., $61.00.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. NORTH CENTRAL STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.
An asterisk (*) after a figure, refers to note below.
A star (★) after city name, denotes no revisions received.

Item	Unit	Green Bay, Wis.	Milwaukee	Minneapolis St. Paul, Minn.	Davenport, Ia.	Des Moines	Sioux City	Kansas City Mo.	St. Louis, Mo.	Lincoln, †† Neb.	Denver, Colo.
(1) Bulk Lime	per cwt.	$2.00	$1.60	$1.80*	$2.00	....	$1.30*	$1.00	$0.70	....	$0.95*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	....	2.00	2.80*	3.50	$2.805	2.40	2.80	2.50	$2.60	2.95*
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	2.75	2.40*	....	....	4.50	4.50	....	2.30	3.50*	....
(5) Crushed Stone	per yd.	....	....	....	3.00	....	....	....	2.83	4.73*	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	14.00	14.50	18.00	17.50	22.00	19.50	22.00	17.00*	17.00*	14.00
(7) Corner Bead, galvanized	per ft.	.05	.05	.04	.05	.055	.045	.05	.035	.05	.05
(8) Drain Tile, 4 in	per ft.	.04	.05	.07	.07	.08	....	....	.10	.08	.08
(9) Drain Tile, 6 in	per ft.	.055	.07	.09	.11	.10	....	.0625	.15	.10	....
(10) Flue Lining, 8½ in. x 8½ in	per ft.	.33	.30	.32	.35	.355	.32*	.27	.27	.40	....
(11) Flue Lining, 8½ in. x 13 in	per ft.	.495	.41	.45	.50	.475	.48*	.40	.41	.60	....
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	55.00*	65.00	65.00	58.00	71.25	65.00*	55.00	41.00	57.50	35.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	15.00*	20.00	12.00	15.00	16.00*	20.00*	10.00	11.00	25.00	9.50
(14) Gravel, washed	per yd.	2.40*	2.25*	2.25	2.10	2.15*	3.50	4.50	2.40*	....	2.00
(15) Hollow Building Tile (8x12x12 in.)	per M.	205.00	150.00	....	...	....	150.50	....	....	....	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	79.50	100.00	100.00	113.00	75.00	80.00	100.00	85.00	73.50	85.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.50	.50	.55	.60	.63	.75	.70	.475	.65	.60
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.75	.60	.65	.65	.73	....	.76	.58	.65	.75
(19) Hair	per bu.	.75	.60	1.00	.75	.60	.75	.35	.65	.75	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.30	.30	.32	.32	.39	.351	.35	.31	.39	.3619
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	.28	.35*	.31	....	....	2885*	.32*	.24	....	.3328*
(22) Mortar Color, red	per lb.	.05	.03	.035	.045*	.045	.03	.025	.023	.035	.0495
(23) Mortar Color, buff	per lb.	.05	.035	.035	.045*	.045	.035	.0325	.0325	.04	.05
(24) Mortar Color, double strength black	per lb.	.06	.055	.06	.12	.055	.04	.035	.04	.08	.10
(25) Partition Tile, Clay (3x12x12 in.)	per M.	....	80.00	95.00	....	140.00	....	125.00	91.00	....	....
(26) Partition Tile, Clay (4x12x12 in.)	per M.	100.00	85.00	105.00	....	150.00	90.00	140.00	97.00	....	....
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	*	.14	.1575	....	.14	.1025	....	.14	.145	.125
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	*	.165	172	....	.17	.1275	....	.17	.165	.15
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	2.80	2.40	2.70	3.00	3.66	2.80	3.20	2.95	3.60	3.80
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(31) Paving Block, Vitrified (3½x4x8½ in.)	per M.	....	....	....	45.00	35.50	....	....	....	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	35.00	45.00*	32.50	55.00	35.50	36.00	36.50	55.00	35.00	37.25
(33) Sand (Building)	per ton	2.40	1.75	....	....	1.35	2.20	....	2.40	2.00	1.60
(34) Sand (Building)	per yd.	....	2.00	....	1.25	1.35*	3.10	....	3.24	2.70	1.60
(35) Sewer Pipe, single strength, on list	per cent	52%*	60%*	....	....	....	40%	....	41%	15%	....
(36) Wall Coping, 9 in.	per ft.	.22	.25	.25	.25	.33	.27	.1875	.1825	.35	....
(37) Wall Coping, 13 in.	per ft.	.33	.35	.35	.34	.47	.37	.255	.255	.45	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	19.00	....	....	....	20 80	17.00	....	22.00	18.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks.	per ton	20.00	20.00*	16.00*	21.00*	20.00*	20.00*	20.00*	24.00*	21.00	20.00
(40) Wall Plaster, sanded, in cloth, 100 lb., inc. sks.	per ton	20.00	14.00*	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloh, 100 lb., inc. sks.	per ton	20.00	20.00*	16.50*	....	21.00*	21.00*	....	21.00*	21.50*	....
(42) Wall Ties, galvanized	per M.	5.25	4.00	3.50	7.00	4 25	3.00	3.50	4.00	4.00	5.00
(43) Wall Plugs	per M.	....	....	....	16.50	31.00	20.00	....	....	20.00	30.00
(44) Asphalt Shingle (*singles, †stripped)	per sq.	6.60*	6.50†	6.50	8.00*	6.30†	8.00†	....	....	7.75**	10.00
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	2.75**	3.50†	3.25	3.25*	2.70	....	....	....	....	3.50*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.85§*	3.00§	2.75†	2.85†	2.48**	....	....	....	4.00§*	3.00*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	55.00	60.00*	55.00	45.00	....	....	....	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	60.00	60.00*	60.00	49.50	....	....	....	....	60.00
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	....	10.00	11.50*	....	10.00*	....	8.00	....	9 00	10.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	....	40.00	45.00*	....	36.00	....	39.50	....	40.00	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	45.00	101.00	56.00	46.80	....	43.50	....	45.00	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	35.00	80.00	42.00	36.00	....	37.00	....	40.00	....
(53) 1x4 No. 2 Sheathing	yer M. Board ft.	....	35 00	65.00*	40.00	34.40	....	31.50	....	35.00	....
(54) 1x4 "B" Flooring	per M. Board ft.	....	65.00	82.00*	97.00	54.00	....	65.00	....	85.00	....
(55) Yellow Pine Clear Finish	per M. Board ft.	....	85.00	105.00	115 00	72.00	....	75.00	....	80.00	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	70 00	70.00*	60.00	48.60	....	55.00	....	60.00	47.50
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	55.00	47.00*	60.00	49.50	....	52.50	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	125.00	....	....	117.00	....	120.00	....	140.00	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	65.00	69.00	....	58.50	....	60.00	....	50.00	....
(60) ½x4 "B" Ceiling	per M. Board ft.	....	60.00	....	....	40.50	....	50.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	55.00	55.00*	....	54.00	....	52.50	....	60.00	....
(62) Mouldings, Yellow Pine	over list	....	50%	50.90	....	25%	....	*	....	....	15%
(63) Washington 16 in., 5/2 Clears	per M.	....	5.50	5.00*	....	....	....	5.50	....	5.50	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	5.25	7.25	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	5.85	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	5.85	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	....	45.00	92 00*	....	46.80	....	52 50*	....	45.00	....

*(Above item 49)—No lumber revisions received for this issue from this city.

††Lincoln, all prices less 5 per cent cash 10th of month.

Lime (Item No. 1, bulk)—Per 80 lb. bu., Denver, Sioux City, hydraulic; Minneapolis and St. Paul, per 180 lbs. (Barreled, Items 2, 3) Minneapolis and St Paul, headed; Denver 200 and 400 lbs.

Crushed Stone (4, 5)—Lincoln, 1 in. and chips; Milwaukee, net.

Common Brick (Item 6)—St. Louis, hard common. Lincoln, Nebr., price for 1st zone, $18.00 2nd zone.

Flue Lining (10, 11)—Sioux City, f. o. b. yard.

Fire Brick (12)—Sioux City, f. o. b. yard; Green Bay, high grade.

Fire Clay (13)—Sacks not included, Des Moines, Sioux City; 5c, Green Bay.

Gravel (14)—Des Moines, 3000 lb. yard; Milwaukee, St. Louis, Green Bay, per ton.

Metal Lath (Item 21)—Milwaukee, Gauge No. 27; Denver, Kansas City, Gauge No. 26; Sioux City, Gauge 27, 2.3 lbs.

Mortar Color (22, 23, 24)—Davenport, discount in quantities.

Partition Tile, Gypsum (Item 27, 28)—Green Bay, prices quoted at time of delivery.

Plaster Board (Item 32) Milwaukee, another quotes $30.00.

Sand (34)—Des Moines, 3000 lb. yd.

Sewer Pipe (35) — Milwaukee 3x12 in.; Green Bay, 3 in. to 24 in. inc.

Wall Plaster (39, 40, 41)—Returned sacks 15c, Milwaukee, St. Paul, Davenport, Des Moines, Sioux City, St. Louis, Lincoln; sacks, 15c, Kansas City.

Asphalt Shingle (Item 44)—Lincoln, Standard wt.

Roofing, Smooth Surf. (Item 46) —60 lbs., Green Bay; 55 lbs., Des Moines, Lincoln.

Roofing, Slate Surf. (Item 45)—85 lbs., Green Bay.

Stucco Board (Items 48, 49)—Minneapolis and St. Paul, $55.00 to $60.00.

(Item 49)—Minneapolis and St. Paul, No. 2, mixed; Des Moines, fir. (Item 50)—Minneapolis and St. Paul, Pine; (Item 53) Minneapolis and St. Paul, Pine; (Item 54)—Minneapolis and St. Paul; Fir; (Item 56)—Minneapolis and St. Paul, No. 2; (Item 57)—Minneapolis and St. Paul, No. 2 clear fir; (Item 61)—Minneapolis and St. Paul, Red Cedar. (Item 62)—Kansas City, list; (Item 63)—Minneapolis and St. Paul, 6 to 12 inches. (Item 67)—Minneapolis and St. Paul, 8 in., $96.00; 10-in., $101.00; 12-in., $106.00; Kansas City, 6 in. to 10 in., $42.50, 12 in. $53.50.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. All prices are retail, delivered-on-the-job, unless otherwise noted. An asterisk (*) after a figure, refers to note below. A star (★) after city name, denotes no revisions received.		WESTERN AND PACIFIC STATES							CANADA			
		Butte, Mont.	Cheyenne, Wyo.	Los Angeles, Calif.	San Diego	San Francisco	Portland, Ore.	Seattle, Wash.	Winnipeg Man.	Toronto, Ont.	Halifax, N. S.	Quebec
(1) Bulk Lime	per cwt.	$0.90	....	$1.10	$1.25	....	*	....	$0.58*	$0.825	$0.75	....
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	....	$3.50	3.00	2.60*	3.25	$3.50	$2.75	3.60	....	3.40*	3.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	5.65*	....
(4) Crushed Stone	per ton	....	....	....	2.12	....	....	....	....	2.445*	.15*	2.50
(5) Crushed Stone	per yd.	....	1.75*	....	....	....	....	....	4.35	2.1875*	3.30	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	21.00	18.00	....	17.50	18.50	17.00	15.50*	19.00	18.00	20.00	16.50*
(7) Corner Bead, galvanized	per ft.	....	.05	.05	.06	0385	.05	.06	.04	....	.045	.06
(8) Drain Tile, 4 in.	per ft.	....	....	....	.105	.05	.06	.072	.13	.08	....	.065
(9) Drain Tile, 6 in.	per ft.	....	....	.0975*	.14	.065	.08	.12*	.15	.11	....	.115
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	....	....	.3375	.50	.38	.45	.40	.55	.42	.35	....
(11) Flue Lining, 8½ in. x 13 in.	per ft.	....	....	.4875	.72	.55	.65	.60	.75	.60	.55	....
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	80.00	.....	.....	70.00	70.00	85.00	75.00	85.00	80.00	90.00	74.50
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	20.00	25.00	12.50	30.00*	20.00	22.00	24.00	40.00	22.00	22.00*	22.50
(14) Gravel, washed	per yd.	3.00	....	....	2.78	1.25	1.35*	....	3.15	1.35	3.65*	1.75
(15) Hollow Building Tile (8x12x12 in.)	per M.	15.00*	....	....	235.00	....	190.00	....	280.00	....	....	....
(16) Hollow Building Tile (8x5x12 in)	per M.	15.00*	....	100.00*	120.00	112.00	100.00	110.00	181.00	....	....	....
(17) Hydrated Lime (masons) in 50 lb paper bags	per bag	1.25	.70*	1.00*	.85	1.10*	.65*	....	.60	.5563	.75	.67
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	....	....	.75	.90	....	.75*	24 00	.60	.5813	.80	....
(19) Hair	per bu.	.75	....	.60	.60*	....	....	....	1.00	....	....	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs ‡	per yd.	....	.42	.3573	.36	.3575	.40	.39	.33	....	.45	.30*
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	....	.38	.3175	....	.3175	.31*	....	....	....	....	....
(22) Mortar Color, red	per lb.	.06	.07	.07	.05	.075	.09*	.08	.09	.0275	.10	.10
(23) Mortar Color, buff	per lb.	.07	.08	.07	.05	.075	.09*	.12	.09	....	.10	.10
(24) Mortar Color, double strength black	per lb.	.07	....	.07	.05	.10	.14*	....	.09	....	....	....
(25) Partition Tile, Clay (3x12x12 in.)	per. M.	....	....	85.00*	120.00	....	....	110.00	181.00	70.00	....	....
(26) Partition Tile, Clay (4x12x12 in.)	per. M	....	....	103.00*	140.00	....	....	120.00	203.00	85.00	.20*	....
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	....	....	....	....	....	....	.155	....	....	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	....	....	....	....	....	....	.165	....	....	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.70	4.60	3.41*	4.12	3.35	3.55	3.65	4.40	4.20	4.40	4.28
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.15	.12	.15	.15	.05	.20	.20	.20	.20
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	55.00	....	65.00	48.00	....	....	....	....
(32) Plaster Board ⅜ in. thick	per M. sq. ft.	65.00	65.00*	....	50.00	....	50.00	.35*	51.00	36.25	37.50	46.00
(33) Sand (building)	per ton	....	....	....	1.63	....	45.00	....	....	1.40*	2.50	2.15
(34) Sand (building)	per yd.	2.50	1.50	....	....	....	1.35	1.25	3.15	3.50	3.75	....
(35) Sewer Pipe, single strength, off list	per cent.	....	....	....	10%	....	....	....	.35*	40%	....	20%
(36) Wall Coping, 9 in.	per ft.	....	....	....	....	....	....	.20	.35	.36	....	....
(37) Wall Coping, 13 in.	per ft.	....	....	....	....	....	....	.28	.45	.54	....	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	22.00	....	....	....	....	....	25.50	18.50	19.00	28.00
(39) Wall Plaster, neat, in cloth, 100 lb. incl. sks	per ton	21.00	....	24.00*	26.00*	23.50*	23.00	23.00*	28.00*	22.50	22.00	....
(40) Wall Plaster, sanded, in cloth, 100 lb. incl. sks	per ton	....	....	....	....	....	....	....	....	14.00	....	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. incl. sks	per ton	21.00	....	....	....	....	....	23.00*	28.00*	12.50*	3.15*‡	....
(42) Wall Ties, galvanized	per M.	....	....	11.50	7.00	6.30	6.00	....	5.00*	....	7.00	4.00
(43) Wall Plugs	per M.	....	....	....	26.00	26.00	30.00	22.50	23.00	....	20.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	....	....	....	....	....	12.00	....	10.50	6.25*	10.50	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	....	....	3.50**	3.25†*	4.50**	3.25*	4.50**	5.10†*	3.25*	4.90†	3.90†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	....	3.75§	3.75§*	3.75§*	3.50§*	3.60§*	3.20§*	4.00§*	3.95§*	4.90§*	3.75§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	....	....	....	48.00*	....	45.00	65.00	....	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	....	....	....	....	....	....	....	....	....
LUMBER ITEMS					†		†		†			
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	9.00*	12.00	10.00	11.00	10.00	5.25*	5.00	11.00*	....	8.00	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	30.00	35.00*	....	37.00	....	20.00*	18.00*	....	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	45.00*	42.50*	....	44.00	....	22.00	18.00*	....	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	40.00*	....	....	39.00	....	12.00*	14.00*	....	....	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	40.00	30.00*	....	29.00	....	10.00	13.00	....	....	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	75.00*	55.00*	....	81.00	....	35.00*	31.00*	....	....	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	100.00	100.00	....	91.00	....	55.00*	65.00*	....	....	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	50.00	55.00	....	68.00	....	35.00*	34.00	....	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	45.00	....	....	....	....	25.00	....	....	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	....	....	....	....	....	....	....	....	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	85.00	55.00	....	65.00	....	35.00*	36.00	....	....	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	50.00	45.00	....	59.00	....	....	30.00	....	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	50.00*	75.00	....	51.00	....	....	52.00*	....	....	....	....
(62) Mouldings, Yellow Pine	over list	*	25%	....	....	....	....	*	....	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	5.00	5.00	....	5.00*	....	3.50	3.50	....	....	....	....
(64) Washington 16 in., 5/2 Clears	per sq	4.00*	....	....	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow Pine Boards	per M.	45.00	....	....	38.00	....	25.00*	18.00*	....	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) means no cloth bags used.

(†) above San Diego lbr. prices means all items are Oregon Pine.

(†) above Winnipeg lbr. prices means 15 per cent off.

(†) above Portland lbr. prices means all items are Fir.

Lime (Item No. 1, bulk)—Per 70 lb. bu., Winnipeg; Portland, price on dock. (**Barreled**, Items 2, 3), per 200 lb. bbl., San Diego, Halifax, 200 and 400 lbs. **Hydrated** (Items 17, 18)—Ton rate, Portland; Portland, 15c credit for returned sacks; Los Angeles, Tiger Brand, fine; San Francisco, per 80 lbs.; Cheyenne, 40 lb. paper bags.

Crushed Stone (Items 4, 5)—Toronto, car lot prices. (Item 4), under 2 in. (Item 5), 2 in. and

Common Brick (Item 6)—Quebec, another quotes $16.00; Seattle, f. o. b. Seattle, Job.

Drain Tile (Item 8, 9)—Seattle, clay; Los Angeles, f.o.b. factory, cartage extra.

Fire Clay (Item 13)—San Diego, returned sacks, 8c; 15c, Halifax.

Gravel (Item 14)—Portland, price on dock; Halifax, cu. yd.

Hollow Building Tile (Item 15, 16) — Los Angeles, 5½x8x11½ (Heath); Butte, per ton at yard.

Hair (19)—Rope fibre used in San Diego, per pkg.

Metal Lath (Item 21)—Portland, Gauge No. 27. Quebec, galvanized.

Mortar Color (Items 22, 23, 24) —Portland, iron oxide.

Partition Tile, Clay (Item 25, 26) —Per sq. ft., Halifax; Los Angeles, f.o.b. factory, cartage extra.

Plaster Board (Item 32)—Cheyenne, sheetrock; Seattle, per yd.

Sand (Item 33)—Toronto, car lots on track.

Sewer Pipe (Item 35)—Winnipeg, price for 4 in.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c, San Francisco, Winnipeg, sacks, 20c, Halifax; sacks, 12c, Los Angeles, San Diego; (Item 41), per bbl., Toronto, Seattle, including sks., 10c each.

Wall Ties (Item 42)—Winnipeg, corrugated.

Roofing Slate Surf. (Item 45)—Los Angeles, 80 lbs.; Seattle, San Francisco, 95 lbs.; San Diego, 55 lbs.; 80 lbs., Winnipeg.

Los Angeles, San Diego, San Francisco, Winnipeg, 55 lbs.; 80 lbs., Halifax; Portland, best grade.

Stucco Board (Item 47)—San Francisco, button lath, ⅜ in. thick.

(Item 49)—Portland, fir: Butte, pine; Winnipeg, 15%. **(Items 50, 51, 52)**—Cheyenne (50) fir; (51) Seattle, fir; Butte, No. 2; (52) Portland, Butte, No. 3 Shiplap: **(Item 53)**—Cheyenne, White Pine. **(Item 54)**—Portland, fir; Seattle, S. G. Fir; Cheyenne, $60.00 & $80.00 fir; Butte, V. G. Coast Fir. **(Item 55)**—Seattle, Portland, fir. **(Item 56)**—Portland, fir; **(Item 59)**—Portland, fir. **(Item 61)**—Seattle, cedar; Butte, cedar; **(Item 62)**—Seattle, Butte, list; **(Item 63)** San Diego, 16 in. "A"

Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum,* 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

ASBESTOS PRODUCTS

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
Ambler Asbestos Shingles. Catalog. 5½ x 8½ in. 40 pp. Illustrated.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 36 pp. Illustrated. Standard Purlin Spacing Tables.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.
Engineers' Data Sheets. Catalog. 8½ x 11 in. 40 pp. Illustrated. Specifications and working sheets for Ambler Asbestos Corrugated Roofing and Siding.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Johns-Manville Asbestos Wood. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data. List of uses for asbestos wood.

BALANCES, SASH

Caldwell Mfg. Company, The, Rochester, N. Y.
Suggestion for the present-day Architect. Booklet. 6 x 9 in. 16 pp. Illustrated. Gives full-size dimensions and information for the purpose of writing specifications for Caldwell Sash Balances.

BOILERS—See Heating Equipment

BRICK

American Face Brick Association, 1151 Westminster Bldg., Chicago, Ill.
The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.
The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect. Price 50c.
A Manual of Face-Brick Construction. Booklet. 8½ x 11 in. Textbook on construction of the brick wall and various uses of face brick. 31 colored plates of brick houses with plans. Price, $1.00.

Common Brick Manufacturers Association of America, 1309 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available. Price $1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 48 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

BUILDING STONE—See Stone, Building

CEMENT

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.
Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Pyrobar Gypsum Tile. Booklet. 8½ x 11 in. 32 pp. Illustrated. Details and specifications for fireproof partitions.
Bulletins, 8½ x 11 in., containing details and specifications for Pyrobar voids for use with reinforced concrete joist floor construction; Pyrobar roof tile; and monolithic gypsum floors and roofs.

DECORATIVE FABRICS

M. H. Rogers, Inc., 912 Broadway, New York, N. Y.
Samples of the following materials will be sent to architects upon request, to meet specific requirements:
Tapestries, velours, damasks, armures, cretonnes, tapestry panels, needlepoints, chair and sofa seats and backs.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.
Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.
Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

Truscon Steel Company, Youngstown, Ohio
Truscon Steel Windows. Catalog. 8½ x 11 in. 80 pp. Illustrated. Describing steel windows for industrial and commercial buildings.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Frink, I. P., Inc., 24th Street and 10th Avenue, New York, N. Y.
Catalog 415. 8½ x 11 in. 46 pp. Photographs and scaled cross sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

Kohler Co., Kohler, Wis.
Kohler Automatic Power and Light 110 Volt D. C. Booklet. 5 x 7 in. 32 pp. Illustrated. Describes a standard voltage automatic, electric power and light plant for isolated homes.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.
Simplex Manual Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Smyser-Royer Co., 1609 Sansom St., Philadelphia, Pa.
Exterior Lighting Fixtures. Catalog F. 8½ x 11½ in. Illustrated. Illustrates lamp standards, brackets, lanterns and pier lights, for exterior use.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 264. 8¼ x 10⅞ in. 54 pp. Illustrated. Gives description with diagrams of various types of motors, generators, generating sets, propeller fans, air heaters, and apparatus for special application.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.
Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.
Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.
Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.
Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 130 West 34th St., New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs and brief descriptions.

Anchor Post Iron Works, 165 Broadway, New York, N. Y.
Catalog 51. 8½ x 11 in. 53 pp. Illustrated. Anchor Post Fences for Country Place, Factory or Farm.
Catalog 54. 8½ x 11 in. 24 pp. Illustrated. Factory Fences.

FIRE DOORS—See Doors, Windows and Trim, Metal

FIREPLACE EQUIPMENT

Covert Co., H. W., 137 E. 46th Street, New York, N. Y.
Hints on Fireplace Construction. Catalog. 5¾ x 8½ in. 11 pp. Illustrated.
Diagrams of construction and installation of Covert "Improved" and "Old Style" Dampers and Smoke Chambers.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 82*

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
Armstrong's Cork Tile. Booklet. 5 x 7 in. 16 pp. Illustrated in color.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
Speaking of Floors. Booklet. 11¼ x 15 in. 16 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1921. Catalog. 3½ x 6 in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book Three books. 3½ x 5¾ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.

Carter Bloxonend Flooring Co., 1303 R. A. Long Bldg., Kansas City, Mo.
Blox-on-end Flooring. Catalog. 3¼ x 6¼ in. 20 pp. Illustrated. Describing Blox-on-end Flooring and its adaptability to concrete, wood or steel construction; also various methods of installation.
Specification Sheet. 8½ x 11 in. 4 pp. Illustrated. Standard specifications in convenient form for architects and engineers as recommended by the American Institute of Architects.

Congoleum Company, Inc. (Linoleum Dept.), Philadelphia, Pa.
Specifications for Laying Linoleum and Cork Carpet, illustrating a new and better method of laying these materials.
Linoleum Service Sheet. Gives complete printed specifications as well as detail drawings showing application in specific cases such as thresholds, staircases, under radiators, etc.
Installation and Care of Battleship Linoleum. Booklet. 6 x 9 in. 16 pp. Illustrated. Instructions as to the uses of Battleship Linoleum, its laying and care.
Quality Sample Book. Showing a sample of plain brown linoleum and of every grade of Battleship Linoleum, Inlaid Linoleum and Cork Carpet.

Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.
Modern Oak Floors. Booklet. 6⅛ x 9¼ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
Oak Flooring, How and When to Use it. Booklet. 3½ x 6¼ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thickness and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

General Chemical Company, The, 25 Broad Street, New York, N. Y.
Hard-N-Tyte for concrete and mortars. Booklet. 3½ x 8½ in. 8 pp. Illustrated. Describes use of Hard-N-Tyte as application for hardening concrete floors.
The Hard-n-tyte Specification. Booklet. 8½ x 11 in. 4 pp. Gives exact specifications for concrete floor finish.
Making poor concrete floors good and good ones better. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describes effects of Hard-n-tyte on concrete floors, with photographs and data.

Sonneborn Sons, Inc., L., 266 Pearl Street, New York.
Concrete and Lapidolith. Booklet. 5⅜ x 8⅜ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolize? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

FURNACES—See Heating Equipment

FURNITURE

Estey Organ Company, Brattleboro, Vt.
Pipe Organs. Complete specifications and full information furnished to the architect for pipe organ to be installed in any given residence, upon receipt of plans and other particulars.

Hampton Shops, 18 East 50th St., New York, N. Y.
Glimpses from Hampton Exhibits. Brochure. 16 pp. 5 x 7½ in. Illustrated. Shows examples of Hampton work and gives one an idea of their resources. Of interest to the client as well as to the architect.

GLASS CONSTRUCTION

King Construction Company, N. Tonawanda, N. Y.
Catalog No. 52. 9 x 11 in. 45 pp. Illustrated. Illustrating and describing greenhouses erected for private estates and public parks.

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3⅞ x 8½ in. 32 pp. Illustrated Covers the complete line.

GRANITE—See Stone, Building

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.

HARDWARE — Continued

Stanley Works, The — Continued
Ball Bearing Butts. Booklet. B8. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 12F 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American District Steam Company, North Tonawanda, N. Y.
Bulletin No. 150-AF. 6 x 9 in. 32 pp. Illustrated. Describes the Adsco System of Atmospheric Steam Heating and explains how it saves 20 to 30% of fuel cost. Tells how to figure radiation.
Catalog No. 21-AF. 6 x 9 in. 200 pp. Illustrated. Lists and describes the full line of equipment and devices manufactured for use on underground and interior steam mains, expansion joints, steam meters, condensation meters, traps, flange fittings, angle fittings, manhole curbs, alignment guides, etc.

American Radiator Co., 816 South Michigan Avenue, Chicago, Ill.
Engineers' Data Book. 8 x 10¾ in. 48 pp. Illustrated. Valuable engineering data for estimating heating and ventilating requirements.
Ventilation for Vento Heaters. Catalog. 8 x 10¾ in. 24 pp. Illustrated. Examples of installation.

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam. Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Excelso Specialty Works, 119 Clinton St., Buffalo, N. Y.
Excelso Water Heater. Booklet. 12 pp. 3 x 6 in. Illustrated. Describing the new Excelso method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)

Gorton & Lidgerwood Company, 96 Liberty St., New York, N. Y.
Gorton Self-Feeding Boilers. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Descriptions, specifications and prices.

Kelsey Heating Company, James St., Syracuse, N. Y.
Booklet No. 5. 4 x 9 in. 32 pp. Illustrated. A dealers' booklet showing the Kelsey Warm Air Generator Method of warming and distributing air. Gives dimensions, heating capacities, weights, kind of coal recommended, and shows the mechanical and gravity system of heating homes, churches and schools.
Monroe Pipeless Booklet. 4½ x 8 in. 20 pp. Illustrated.
Monroe Tubular Heater. Booklet. 4½ x 8 in. 20 pp. Illustrated. General Booklet giving capacities, dimensions, weights, etc.
Syracuse Pipeless Booklet. 4½ x 8 in. 12 pp. Illustrated. General Booklet, giving sizes and capacities.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.

Minneapolis Heat Regulator Company, Minneapolis, Minn.
The Heart of the Heating Plant. Catalog. 6 x 9 in. 20 pp. Illustrated. Describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used.

Page Boiler Company, The Wm. H., 141 West 36th Street, New York, N. Y.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions with specifications of the Volunteer Round and Monarch Square Sectional Boilers: also the Monarch Up-Draft and Down-Draft Smokeless Boiler; with method for apportioning size of boiler and radiation, and other heating data.

Smith Co., H. B., 57 Main Street, Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 230. 8¼ x 10⅞ in. 132 pp. Illustrated. Gives description and data tables of various types of heaters, also of steam traps.
Bulletin No. 227. 8⅜ x 10 11/16 in. 28 pp. Blue prints of heating and ventilating layouts in public buildings, factories, etc.
Catalog No. 1015. Book on Heating and Ventilating, complete with installations and diagrams.

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¼ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
Capitol Smokeless Type Boilers. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describing a new type of low-pressure heating boiler which burns soft coal without smoke.

Warren Webster & Co., Camden, N. J.
Webster Vacuum System of Steam Heating. Catalog. 8 x 10½ in. 36 pp. Illustrated. Describing the Webster Vacuum System of Steam Heating, its principles of operation, and advantages of installation.
Webster Feed-Water Heaters. Catalog. 8 x 10½ in. 28 pp. Illustrated. Describing the construction and operation of the Webster Feed-Water Heaters for steam-heating systems, power plants and industrial plants of every type.

HEAT REGULATORS—See Heating Equipment

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 83*

HOLLOW TILE—See Tile, Hollow

INSULATION

Bishopric Mfg. Company, 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Business Noise, Its Cost and Prevention. Booklet. 6 x 9¼ in. 16 pp. Illustrated. Data on correction of acoustics in offices, theaters, churches, etc.

Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Bulletin. 8½ x 11 in. Gives details and specifications for insulating roofs to prevent condensation.

JOISTS AND STUDS, PRESSED STEEL

Truscon Steel Company, Youngstown, Ohio
Truscon Structural Pressed Steel. Catalog. 8½ x 11 in. 24 pp. Illustrated. Information on Pressed Steel Beams and Joists for light occupancy buildings. Tables, specifications and views of installations.

LATH, METAL AND REINFORCING

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

Truscon Steel Co., Youngstown, Ohio.
Hy-Rib and Metal Lath. 18th ed. Catalog. 8½ x 11 in. 64 pp. Illustrated. Gives properties of laths, specifications, special uses and views of installations.

LIGHTING SYSTEMS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Diffuselite System of Lighting. A number of leaflets and folders covering Diffuselite Paints, Blinds and Fixtures.

LUMBER

California Redwood Assn., 206 Marvin Bldg., San Francisco, Calif.
California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated. Describes the use of Redwood Lumber for various places and conditions in the building of the home.

Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.
The Post Everlasting. Booklet. 10½ x 7½ in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.
Poles That Resist Decay. Booklet. 9¼ x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.

Morgan Millwork Organization, Chicago, Ill.
Building With Assurance. Book. 8½ x 11 in. 408 pp. Illustrated. Valuable to architects for the Standardized Mill Work illustrated and described.
Price Supplement. Catalog. 4 x 8 in. 96 pp. Illustrated. Prices all illustrations in "Building With Assurance" and is valuable in connection with it or by itself.

Pacific Lumber Company of Illinois, The, 1105 Lumber Exchange Bldg., Chicago.
Engineering Digest. Redwood Information Sheets. 1. General Data Sheet on Redwood, its Production and Uses. 2. Tanks and Vats for Water, Acid and Alkali Solutions and Oil. 3. Pipe for Water, Chemicals and Sewage Conveying. 6. Farm and Dairy Buildings and Equipment, Silos, Tanks, Pipe, Outbuildings, Irrigation Flumes, Drainage Boxes, Greenhouses, Etc. 9. Railroad Construction and Equipment. 10. Industrial Building Materials. 11. Residential Building Materials.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Brass Company, Waterbury, Conn.
Illustrated pamphlet describes the use and adaptability of extruded architectural shapes to meet the architect's design.

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.

Rome Brass & Copper Company, Rome, N. Y.
Descriptive Price List. 5 x 7 in. A leather-covered loose-leaf book listing sheets, tubes, rods, rolls, anodes, strips, extruded shapes, angles and channels, tapered tubes and hose pipes; molding, door-rail; commutator bars and segments; electrical copper bar, rivets and burs.

METAL TRIM—See Doors, Windows and Trim, Metal

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6⅜ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

OFFICE SUPPLIES

Dixon Crucible Co., Joseph, Pencil Dept., 224 J. Jersey City, N. J.
Finding Your Pencil. Booklet. 6¼ x 3¼ in. 16 pp. Illustrated.
The First Five. Booklet. 3½ x 5¼ in. 10 pp. Illustrated.
A Study in Sepia. Booklet. 7 x 4½ in. 5 pp. Illustrated.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Berry Brothers, Detroit, Michigan.
"Natural Woods and How to Finish Them." Booklet. 6½ x 4¾ in. 95 pp. Containing technical information and advice concerning wood finishing.
"Beautiful Homes." Booklet. 8½ x 6½ in. 26 pp. Illustrated in colors. Giving information to home builders and others on interior finishing.

Boston Varnish Co., Everett Station, Boston, Mass.
The Inviting Home. Booklet. 5½ x 9 in. 16 pp. Color Plates. A briefly worded book on painting for the busy architect or decorator.

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

Fox Co., M. Ewing, New York, N. Y.
Calcimines. Booklet. 3¼ x 6¼ in. 8 pp. Color cards.

S. C. Johnson & Son, Racine, Wis.
The Proper Treatment for Floors, Woodwork & Furniture. Booklet. 6¼ x 8⅜ in. 32 pp. Illustrated in color. A treatise on finishing hard and soft wood in stained and enameled effects; also natural wood effects.
Portfolio of Wood Panels. 5½ x 10¾ in. 14 pp. A portfolio containing actual panels of finished woods. Also contains valuable information on finishing and re-finishing floors and woodwork.

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book. 5½ x 3¼ in. 100 pp. Gives directions and formulas for painting various surfaces of wood, plaster, metal, etc., both interior and exterior.
Red Lead in Paste Form. Booklet. 6¼ x 3½ in. 16 pp. Illustrated. Directions and formulas for painting metals.
Came Lead. Booklet. 8¾ x 6 in. 12 pp. Illustrated. Describes various styles of lead cames.
Cinch Anchoring Specialties. Booklet. 6 x 3½ in. 20 pp. Illustrated. Describes complete line of expansion bolts.

O'Brien Varnish Co., 1121 Washington Avenue, South Bend, Ind.
That Magic Thing Called Color. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.
Architects' Specification Manual. 8½ x 11 in. 50 pp. Complete specifications for all paint products.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Preservative Coatings. Booklet. 6 x 9 in. 15 pp. Illustrated. Presents in a concise manner the properties and uses of the Standard Paint Company's various paint preparations.

Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.

Wadsworth-Howland Co., Inc., Boston, Mass.
Paints and Varnishes. Catalog. 5¾ x 8½ in. 140 pp. Illustrated. Covers the complete line.

PARTITIONS

Improved Office Partition Company, 25 Grant St., Elmhurst, L. I.
Telesco Partition. Catalog. 8¼ x 11 in. 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.
Detailed Instructions for erecting Telesco Partitions. Booklet. 24 pp. 8½ x 11 in. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Folding Partitions. Booklet. 8½ x 11½ in. 16 pp. Illustrated. Covers the field of folding partitions for churches, schools, hotels, clubs and public institutions.
Rolling Partitions, Hygienic and Disappearing Door Wardrobes. Booklet. 6 x 9 in. 32 pp. Illustrated. Describes rolling partitions, particularly in churches and schools, and wardrobes as installed in schools and public institutions.

PIPE

American Brass Company, Waterbury, Conn.
Illustrated pamphlet giving tables of weights and price-lists devoted to Brass and Copper Pipe in iron pipe and plumbers' sizes.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.

PLUMBING EQUIPMENT

American Brass Company, Waterbury, Conn.
Benedict Nickel. Illustrated pamphlet descriptive of Benedict Nickel White Metal for high-grade plumbing fixtures.

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 84*

PLUMBING EQUIPMENT — Continued

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.

Kohler Co., Kohler, Wis.
Kohler of Kohler. 5½ x 8 in. 48 pp. Illustrated catalog. Shows complete line of plumbing fixtures.

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Speakman Company, Wilmington, Del.
Speakman Showers and Fixtures. Catalog. 4½ x 7½ in. 250 pp. Illustrated. Catalog of Modern Showers and Brass Plumbing Fixtures, with drawings showing layouts, measurements, etc.
Toned Up In Ten Minutes. Booklet. 7½ x 10½ in. 16 pp. Illustrated. Modern Showers and Washups for Industrial Plants, showing the sanitary method of washing in running water.

Wolff Manufacturing Company, 255 No. Hoyne Ave., Chicago, Ill.
Plumbing Suggestions. Catalog. 3¼ x 6 in. 50 pp. Illustrated. Illustrating, describing and pricing Wolff Quality Plumbing Fixtures for residential installation.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10⅝ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

ROLLING DOORS AND SHUTTERS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Rolling Doors and Shutters—Steel and Wood. Catalog. 8½ x 11½ in. 80 pp. Illustrated. For engineers and architects. Covers all classes of heavy doors, for every purpose, and in great variety of materials, bronze, steel and wood. Many sheets of detail drawings.

ROOFING

American Brass Company, Waterbury, Conn.
Copper Products for Roofing Purposes. Illustrated price-list devoted to copper products, including sheets and rolls, for fabricating into leaders, gutters, flashings, shingles, etc.

Creo-Dipt Company, 1025 Oliver St., North Tonawanda, N. Y.
Architectural Service Sheets. 8½ x 11 in. Illustrated. Working drawings of construction, with standard specifications for design and construction of same.

Philip Carey Co., The, Cincinnati, Ohio.
Architects Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Illinois Zinc Company, 280 Broadway, New York, N. Y.
Pure Rolled Zinc. (Corrugated and Plain Sheets.) Booklet. 3½ x 6¼ in. 8 pp. Illustrated. Facts regarding adaptability of zinc for roofing. Specifications of corrugated zinc sheets. Weights per square. Comparative gauge lists.
The Roof That's Always New. Booklet. 3⅝ x 6 in. 12 pp. Illustrated. Story of Illinois Zinc Shingles, their everlasting and artistic qualities. Information regarding a complete zinc roof, shingles, starting piece, valley, ridge and hip piece.

Johns-Manville, Inc., Madison Avenue and 41st Street, New York.
Johns-Manville Colorblende Asbestos Shingles. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. 3½ x 6 in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Instructions for Laying Built-up Roofs. Booklet. 8½ x 11 in. Illustrated.
Roofing Facts Worth Knowing. Booklet. 6 x 9 in. 16 pp. Illustrated.

N. & G. Taylor Company, 300 Chestnut Street, Philadelphia, Pa.
Selling Arguments for Tin Roofing. Booklet. 6¼ x 9¼ in. 80 pp. Illustrated. Describes the various advantages of the use of high grade roofing tin, gives standard specifications, general instructions for the use of roofing tin, illustrates in detail methods of application.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHEATHING

Bishopric Mfg. Company, 103 Este Ave., Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

STANDARD BUILDINGS

Truscon Steel Co., Youngstown, Ohio.
Truscon Standard Buildings, 4th ed. Catalog. 8½ x 11 in. 40 pp. Illustrated. Erection details, cross-section diagrams and adaptations are given.

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Vol. 1. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 4. Indiana Limestone Bank Book. 6 x 9 in. 48 pp. Illustrated. Descriptive of the use of Indiana Limestone for bank buildings, with partial list of buildings in which it has been used.
Vol. 27. Designs for Houses of Indiana Limestone. 8½ x 11 in. 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review.*

STORE FRONTS

Kawneer Co., The, Niles, Mich.
Kawneer Solid Copper Store Fronts. Catalog. "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
A Collection of Successful Designs. Catalog. 9¼ x 6½ in. 64 pp. Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

Zouri Drawn Metals Co., B. J. 10, Chicago Heights, Ill.
Architects' Catalog. 8¾ x 11¾ in. 86 pp. Illustrated. Showing a true copy of the approval of the Underwriters' Laboratories. Showing a proper glazing specification, based on the Underwriters' Report.
Catalog B. J. 8. 6 x 9 in. 68 pp. Illustrated. Key to Getting the People In.

STUCCO BASES

Bishopric Manufacturing Co., 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco board and Bishopric sheathing board.

STUCCO, MAGNESITE

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

TERRA COTTA

Atlantic Terra Cotta Co., 1170 Broadway, New York, N. Y.
Questions Answered. Booklet, 7½ x 5¼ in. 32 pp. Illustrated. A synopsis of questions most frequently asked by architects in relation to terra cotta, with brief but complete answers; contains many illustrations.

National Terra Cotta Society, 1 Madison Avenue, New York, N. Y.
Standard Construction, Indexed, bound volume. 10½ x 16 in. 90 pp. 70 Illustrations. Standard forms of terra cotta construction with short article.
"The School." 10½ x 13½ in. 34 pp. 92 Illustrations. Types of school buildings with short descriptive articles. Volume I, brochure series.
"The Theatre." 10½ x 13½ in. 36 pp. 102 Illustrations. Types of theatre buildings with short descriptive articles. Volume II, brochure series.
"The Store." 10½ x 13½ in. 34 pp. 60 Illustrations. Types of store buildings with short descriptive articles. Volume III, brochure series.

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

THERMOSTATS—See Heating Equipment

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

Norton Company, Worcester, Mass.
Alundum Safety Tile. Booklet. 5 x 8 in. 15 pp. Illustrated. Description of material and its installation.
Tests of Alundum Tile. Booklet. 5 x 8 in. 18 pp. Illustrated. Describes its composition and proves its adaptability for its innumerable purposes.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 85*

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172. 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.
Fireproof Buildings of Natco Hollow Tile. Booklet 8½ x 11 in. 16 pp Illustrated. Showing the use of Natco Hollow Tile for private residences.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates.
Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ in. 16 pp. Illustrated.

Warren Webster & Co., Camden, N. J.
The Webster Type N Modulation Valves. Catalog. 8 x 10½ in. 8 pp. Illustrated. Describing a quick response, conveniently operated, and simple radiator supply valve.
The Webster Sylphon Trap. Booklet. 8 x 10½ in. 12 pp. Illustrated. Explaining the importance of the properly operating radiator return trap.

VENTILATION

Globe Ventilator Co., Dept. P., Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.

WALL BOARDS

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Walls of Worth. Booklet. 8½ x 11 in. 24 pp. Illustrated. Describes Sheetrock, the fireproof wall board, its advantages and uses

WATERPROOFING

Ruberoid Co., The, 95 Madison Ave., N. Y.
Impervite. Circular. 8½ x 11 in. 4 pp. Illustrated. An integral waterproofing compound for concrete, stucco, cement, mortar, etc.

WATER SOFTENERS

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WINDOW HARDWARE

The Kawneer Company, Niles, Mich.
Kawneer Simplex Windows. Catalog. 8½ x 10½ in. 16 pp. Illustrated. Complete information, with measured details, of Kawneer Simplex Weightless Reversible Window Fixtures, made of solid bronze. Shows installations in residences and buildings of all sorts.
Detail Sheets and Installation Instructions. Valuable for architects and builders.

Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¼ in. 24 pp. Illustrated. Covers complete line.

Smith & Egge Mfg. Co., The. Bridgeport, Conn.
Booklet. 6¾ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

WINDOWS, CASEMENT

Crittall Casement Window Co., 2703 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.

Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Architects' Portfolio. 8½ x 11 in. Loose-leaf. Large scale working details for mill-work and installation.
F. S. Details 20 x 23 in. and 15 x 22 in. Working details for mill-work and installation.
Hoffman Casements Catalogue. 7 x 8½ in. 16 pp. Illustrated.

Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

WOOD — See Lumber

F. a.

THE ARCHITECTURAL FORUM

NOVEMBER 1921

Single Copy Sixty Cents ROGERS AND MANSON CO., PUBLISHERS Six Dollars the Year

THE ARCHITECTURAL FORUM

VOLUME XXXV NUMBER 5

CONTENTS for NOVEMBER 1921

PLATE ILLUSTRATIONS

LETTERPRESS

ALBERT J. MacDONALD, Editor

Published Monthly by
ROGERS AND MANSON COMPANY
142 Berkeley Street, Boston 17, Mass.
Advertising Department, 103 Park Avenue, New York
YearlySubscription, payable in advance, U.S.A., InsularPossessionsandCuba, $6.00
Canada..........$6.75 Foreign Countries in the Postal Union, 7.50
Single Copies..........60 cents All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.

Albert J. MacDonald, Pres. and Treas., S. Howard Myers, Vice-pres., Robert Sweet, Sec.

THE EDITOR'S FORUM

FIRE PREVENTION

THE growing movement in America toward Fire Prevention brings forward suggestions dealing with various phases of the problem, many of which are worthy of serious consideration. A number of practical suggestions are contained in this letter from one of our correspondents, published for the benefit of our readers.—THE EDITOR.

To the Editor of THE ARCHITECTURAL FORUM:

The wide awake dailies are most favorably disposed to the plan afoot to treat fire, as it is very generally treated in Europe, as a personal liability for one's carelessness wherever a fire originates (and seven-tenths of the fires are attributable to someone's negligence or worse), charging him with the expense of fire department work, damage to neighbors, etc. Fine! I hope that suggestion becomes an enforceable fact!

But there are two other deterrents that should go with it.

Why penalize a man for doing the right thing? That's what we are doing today. A man builds the best we know how—fireproof construction, incombustible materials, every device to lessen fire hazard. It all costs money and the more it costs, the greater the investment and the higher the taxes. The one who builds as skimpily as the law exacts, spends much less and consequently pays smaller taxes. Yet it is for his protection that fire departments are maintained, and much of our heavy tax is expended because of and for him. Reverse that. Let the tax be lessened as one expends more on his property for fire protection and thus lessens the cost to the community. Sensible, is it not? Then let us hammer for it.

Next. No term in the English language is more abused than "Fireproof." A hotel owner smears some silicate paint over a wooden partition and forthwith advertises, in letters six feet high on his side wall, that his building is "Absolutely Fireproof"! I've advocated for years, and it is only a question of time when we'll do it, that the authorities affix to the main doorway of every public or semi-public building, apartment or other dwelling place where there are more than twenty people under one roof, a label, "Fire Resisting," "Ordinarily Protected" or "Dangerous," as the construction of the building may warrant. It is just like a license tag on one's machine, a notice to the public as to what sort of a building one is going into. How long will a landlord with "Dangerous" over his portal be able to rent that building or beguile people into it? It would expedite Fire Prevention more rapidly than any other one remedy we can apply!

F. W. FITZPATRICK

A CORRECTION

IT has been called to our attention that an error appears in the calculations given in connection with the article on "The Prevention of Heat Losses" in THE FORUM for September. On page 98 a passage in one paragraph in the second column should read: "With Prof. Peebles' determinations, however, it is possible to substitute in the second part of the formula 1 square foot of radiation for every 18 5/10 square feet (instead of 15 square feet) net exposed wall surface * * * or to substitute 25 1/10 square feet for the 15 square feet if the best insulation, shown in Fig. 2, is used."

At the bottom of the same page, the saving effected in the cost of installing heating apparatus in a house at Winnetka, Ill., amounting to $554, should be added to the capitalized saving on the amount of coal used, $1,670, making a grand total of $2,224.

FIFTH AVENUE SIGNAL TOWERS

SELECTION of a design for the signal towers, which experiment has proved to be successful in regulating traffic on Fifth avenue, has recently been announced and designs placed on exhibition.

Joseph H. Freedlander, architect, of 681 Fifth avenue, submitted the design which, after weeks of consideration, was unanimously adopted by the committee as the most practical as well as the most appropriate, and to Mr. Freedlander has been awarded the cash prize of $500; he will also be retained as architect to prepare the working drawings and supervise the construction of the towers. The second prize of $300 went to Ralph T. Walker, 1123 Broadway, and the third choice, which also carried with it a prize of $300, was awarded to Electus D. Litchfield & Rogers, 477 Fifth avenue.

The new signal towers, which will be presented to the city by the Fifth Avenue Association, are to be constructed almost entirely of bronze, with granite bases. They will be 23 feet in height.

ARCHITECTURAL EXHIBITION AT MONTCLAIR, N. J.

BEGINNING November 21 with a private view and address, by George Clarke Cox, Ph.D., the Montclair Art Association will hold an exhibition of architectural photographs, drawings, sculpture, interior decoration and other items which usually go to making up such an exhibit. The arrangement of the exhibit is under the general charge of William E. Moran, architect, of New York and Glen Ridge, N. J., who has secured the co-operation of prominent members of the profession.

A feature of this exhibit will be a collection of photographs and drawings of many old houses of the early Dutch settlers.

How Building In An Environment Built Up the Quality of Telesco Partition

Isn't it so, that there are more things in most things than the things you see? Let's put our finger on one of the things; Quality, for instance.

If you attempt to build a high quality product in low quality surroundings, some of that low quality is bound to creep into the feeling of the workmen—and inevitably, into the product.

That is exactly why I came out here to our new plant, these five acres on top of the hill, with its grove of old trees, its flowers and fine, airy, light buildings and plenty of room to grow.

Here it is, under conditions of health and happiness, that we build Telesco Partitions. Here our men, with the true love of craft, build them just the best they know how. The environment helps them do it *uniformly*, day after day. They unconsciously build it into every foot they build. A factory in a grove of trees may sound like idealism. But you know full well it is simple, sound-sense economics.

So much for what I have to say about the *quality* of our partitions. Now, here is what the Nebraska Auto Company, of Lincoln, Nebraska, say of it as a *movable asset.*

Henry Klein
President

We have moved several times, and have always lost completely our investment in fixtures in each move. It has cost us several thousand dollars in the past. But I feel now that the investment we have made in your Telesco Partitions is just as much of a movable asset as a desk or chair.

NEBRASKA BUICK AUTO COMPANY,
Chas. Stuart, *Secretary-Treasurer.*

Our catalogue shows the complete construction

2-C

IMPROVED OFFICE PARTITION COMPANY
25 GRAND ST. ELMHURST, NEW YORK, N.Y.

ENTRANCE PORTICO
SMITH MEMORIAL HALL
UNIVERSITY OF ILLINOIS, URBANA, ILL.
JAMES M. WHITE, ARCHITECT
G. E. WRIGHT, ASSOCIATE ARCHITECT

The
ARCHITECTURAL
FORUM

VOLUME XXXV NOVEMBER 1921 NUMBER 5

Villas of the Veneto

IV. THE VILLA CORNARO AT PIOMBINO, NEAR CASTELFRANCO

By HAROLD DONALDSON EBERLEIN *and* ROBERT B. C. M. CARRERE

"That house only ought to be called convenient, which is suitable to the quality of him that is to dwell in it, and whose parts correspond to the whole and to each other."

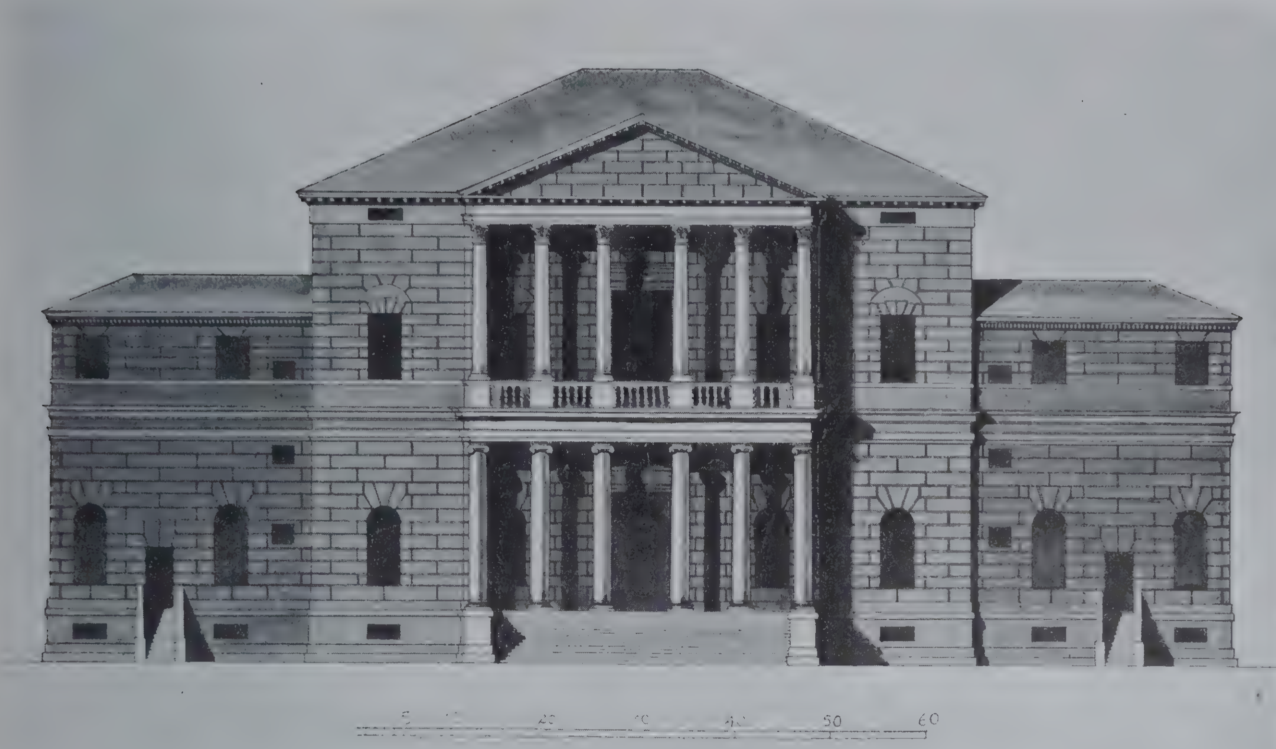
HERE we have in a nutshell Palladio's philosophy of domestic architecture. It is very cogently expressed, and to discern its full force one needs but remember that in his translation Isaac Ware used "convenient" in its broader, seventeenth century sense as "fitting" or "seemly." Messer Andrea was fully sensible of the fact that the very raison d'être of a house is to shelter appropriately the life lived within its walls. He also recognized in equal measure that as the manner of life must necessarily differ for men of different stations in a complex social order, so also must the external expressions of domestic architecture differ to accord with the several estates of those who are to live in the houses.

As to the particular form with which he chose to express his convictions in design, let us take his own words when he writes "the architect ought above all to observe, that (as Vitruvius says in the first and sixth books) for great men, and particularly those in a republic, the houses are required with loggia's and spacious halls adorned, that in such places those may be amused with pleasure who shall wait for the master to salute, or ask him some favour"—a thoughtful provision of enticement for these sixteenth century successors of the old Roman "client," as well as for "the virtuous friends and relations" alluded to in a previous paper.

When Palladio penned this generalization regarding proprieties of plan, he may well have had in mind this very villa at Piombino, in the Trevisan Marches. The "magnificent Signor Giorgio Cornaro," for whom the house was designed, was a person of consequence in the Venetian state—a member of a noble family that had supplied more than one doge since the thirteenth century and was destined to supply more—a family upon whose

Villa Cornaro. View of the South Front from Parked Space beyond Gates

GENERAL VIEW OF THE NORTH OR PRINCIPAL ENTRANCE FRONT
VILLA CORNARO, PIOMBINO, NEAR CASTELFRANCO, ITALY

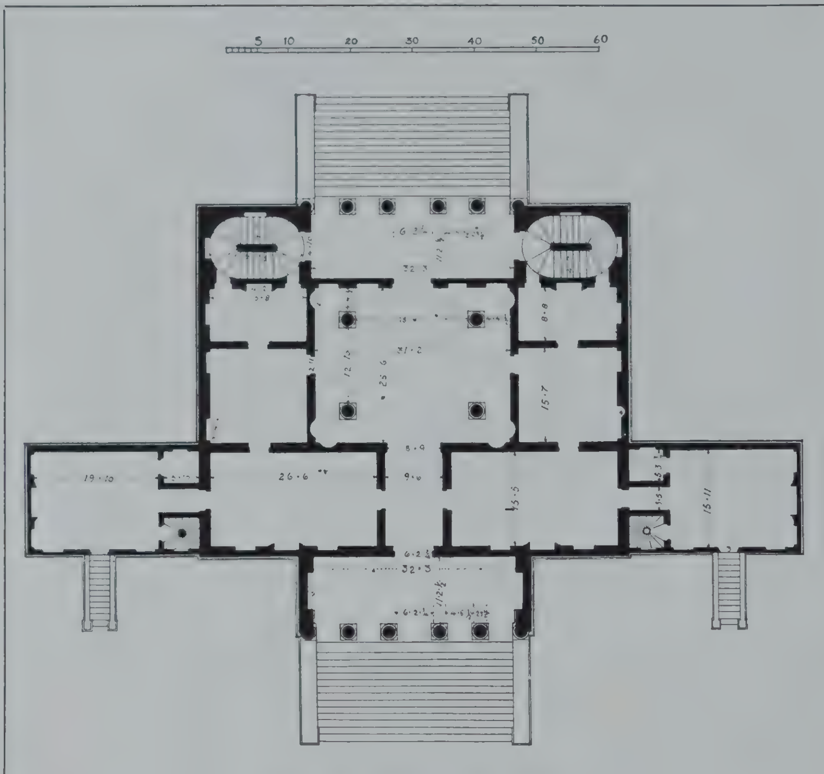


Elevation of North Front after Scamozzi's Drawings

sons the republic, according to its wont with those of ducal rank, was ever ready to impose the fulfillment of exacting public services; a man of wealth and broad interests, and a near kinsman of that ill-starred Caterina Cornaro, Queen of "Jerusalem, Armenia and Cyprus" until the paternalistic government of her native city, coveting her kingdom for its own purposes, forced her to abdicate and sent her to live in a semblance of her erstwhile royal estate at Asolo. It was fitting, therefore, that a noble of such note and connections should have a princely house, and such a house did Messer Andrea build him—about 1570, if the local tradition be correct—a house which Scamozzi properly deemed one of Palladio's most beautiful creations.

"The hall is placed in the most inward part of the house, that it may be far from the heat and cold"—the quotation is from Ware's translation of Palladio—"and the wings where the niches are seen, are in breadth the third part of its length. The columns answer directly to the last, but one, of the loggia's, and are as far distant from one another, as they are high. The large rooms are one square and three quarters long. The height of the vaults is according to the first method for the height of vaults [Bk. I, Ch. 23]. The middle sized rooms are square, one-third higher than they are broad; their vaults are *à lunetti*. Over the small rooms there are *mezzati*. The loggia's above are of the Corinthian order. The columns are one-fifth less than those underneath. The rooms are with flat ceilings, and have some *mezzati* over them. On one part is

West End of Villa Cornaro



Main Floor Plan of Villa Cornaro

idea of the fabric as it is today.

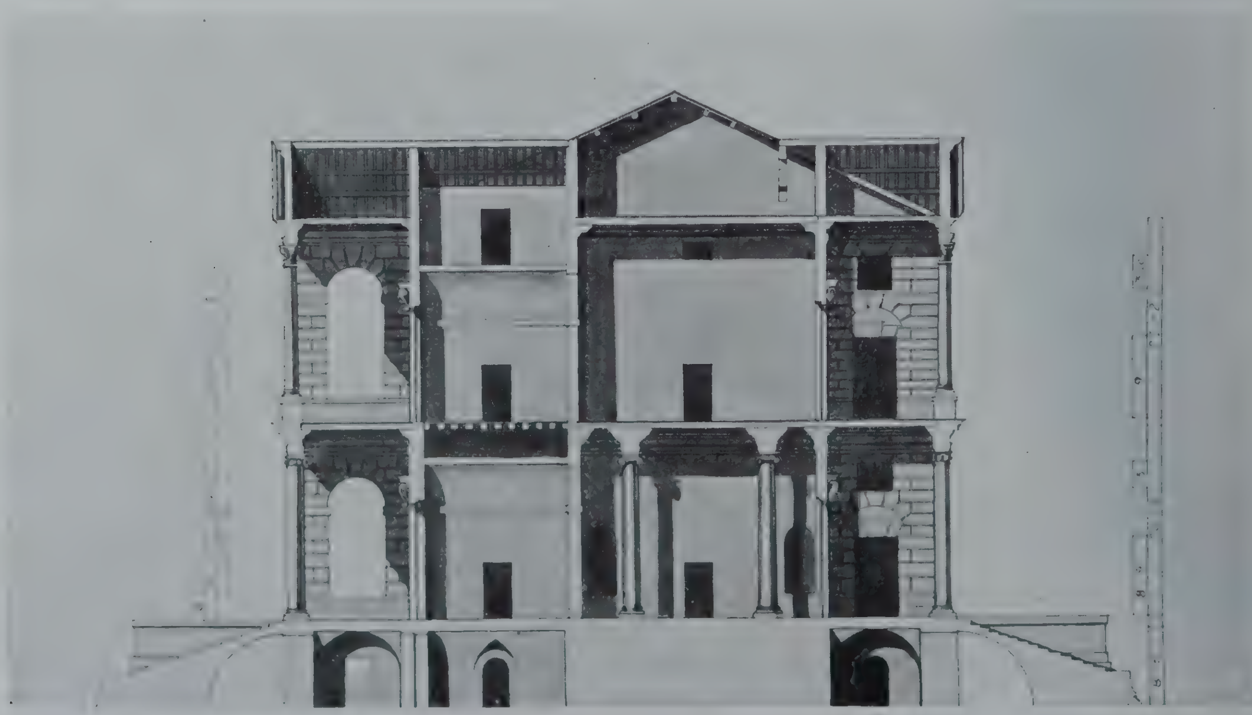
One caution it is necessary to impress upon the reader before going further. The careful student who undertakes to collate the available documents will observe that Palladio's own drawings, the drawings here reproduced, and the photographic records do not all tell exactly the same story. There are manifest discrepancies, on the one hand, between Palladio's plan, measurements and elevation and the plan, elevation and measurements here published. On the other hand, furthermore, there is not complete coincidence between the last named data and the photographic testimony.

The explanation of this three-sided divergence is this: Palladio published plan, measurements and elevation as he originally designed them.* Scamozzi (edition Vicenza, 1786), upon the basis of which the accom-

the kitchen, and places for housewifery; and on the other places for servants." Palladio's literary style is not so lucid as it might be, to begin with, and Ware's translation might have been happier, to say the least, but by comparing the description with the plan, elevation, section and the photographic reproductions one may gather an accurate

	*As Designed by Palladio	As Executed
Width of vestibule	32′	31′ 2″
Length of vestibule	27′ 3″	25′ 6″
Width of entrance passage	10′	9′ 6″
Width of great chambers	16′ 5″	15′ 5″
Length of great chambers	24′	26′ 6″
Square chambers	16′	15′ 7″
Width of cabinets	10′	8′ 8″
Distance between central columns	6′	6′ 2¼″

These measurements are given in the Vicenza foot.



Cross Section of Villa Cornaro after Scamozzi's Drawings

panying plan, measurements, elevation and section are given, with some recent additional verifications, gave the version of the villa as actually built, and was careful to note the most important variations between Palladio's measurements and his own, a table of which appears in the subjoined footnote. In the course of years, sundry changes have been made, such, for example, as removing the steps and blocking up the doors in the wings, and it is the present state of the fabric we find recorded in the illustrations. Between the two last named classes of documents no serious discrepancy occurs, with one exception. In both the Scamozzi and Palladio versions the ascents to the loggias, north and south alike, appear as runs of continuous steps. That they consist of short ramps separated by runs of three steps, that they extend much farther outward from the building than the plans and section indicate, and that the treatment of the balustrades is different from that shown in the elevation, is quite clear from the illustrations. Why Scamozzi did not correct this in his version, whether as an extramural matter he thought it not sufficiently important to change, or whether as a subsequent alteration of Palladio's design he deemed it improper to indicate, it is impossible to say. At any rate, it seemed advisable to let the record stand as shown in the drawings.

As is the case with so many of Palladio's country houses, the Villa Cornaro is built of brick and coated over with an excellent quality of stucco, finished with a *marmorino* surface which has well withstood the effects of time and taken on much the appearance of light limestone, the effect being considerably heightened by the rustication. The shafts of the columns are also of brick, specially shaped, and coated with *marmorino* finished stucco, while the bases are stone and the capitals terra cotta painted or stucco washed. Both Ionic and Corinthian capitals are more refined in detail in the south than in the north loggias. The balustrades of the loggias and the steps are of white Istrian stone, and the ramps, between the runs of triple steps, on the broad ascents to both north and south loggias, are cobbled, and now thickly grown with grass.

The ground floor loggias are paved with large bi-colored elongated hexagons, each composed of two bricks, one straw colored, the other orange, with the corners clipped to form the hexagon. The same paving is found in some of the rooms, while the others are floored with the large bricks commonly used for that purpose in old Italian houses, or else with terrazzo. In the large enclosed and oval shaped south staircases, which communicate directly with the ground floor and main floor loggias by open doorways without doors, the steps are made of brick set on edge. So far as any paint is left upon the shutters, it seems once to have been green. The roof is of the usual reddish tiles. Inside, the ceiling of the great hall is beamed and bears the original *cinquecento* arabesque decorations in an agreeable combination of white, yellow and dark blue. As the section shows, there is a second great hall on the main floor, directly above

Villa Cornaro. Loggias and Ramp of South Front

GREAT HALL LOOKING TOWARD NORTH DOORWAY

INTERIOR, SECOND FLOOR OF NORTH PORTICO

VILLA CORNARO, PIOMBINO, NEAR CASTELFRANCO, ITALY

that on the ground floor, and of the same dimensions. Here also the ceiling is beamed and painted in the same manner as that in the lower hall, only a little more elaborately and with a greater variety of color.

In the seventeenth century the baroque decorators adorned the doorways in the lower hall with highly wrought plasterwork, very good of its kind and admirably executed. They also added stucco embellishments for the chimney-pieces in some of the rooms on the main floor, and likewise contrived ornate plaster frames in several of the ground floor rooms to enclose a series of well conceived but very indifferently executed frescoes of biblical subjects. To the seventeenth century also belong the gates opening on the street, an achievement in wrought iron of such beauty that it somewhat inclines us to forgive the contemporary frescoes just alluded to.

Mr. Fletcher's classification of Palladio's country houses, according to five types of plan, is probably familiar to the reader:—(1) block type, without wings; (2) central block with quadrangle; (3) central block with straight wings; (4) central block with quadrant wings; and (5) central block with returned wings. The Villa Cornaro belongs to

Entrance Gates, North Front

Villa Cornaro. Detail of Ironwork of Entrance Gates on North Front
An addition made in XVII Century to original work

the third type, but in disposing the layout Palladio departed from an arrangement to which he appears to have been partial and which, indeed, he expressly mentions as an important detail to be observed in the planning of villas—that "the covertures for the things belonging to a villa, must be made suitable to the estate and numbers of animals; and in such manner joined to the master's habitation, that he may be able to go to every place under cover, that neither the rains, nor the scorching sun of the summer, may be a nuisance to him, when he goes to look after his affairs." The stables and other accessory buildings are set separately at a little distance from the house, and lie along the road, with an arcaded portico opening upon the grounds. A thoroughly practical and worthy piece of composition, thus, the north side, but not nearly so imposing and stately as the arrangement to the south of the house.

Here a broad *tapis vert*, bounded east and west by lofty avenues of plane trees, extends a goodly distance to the park gates, set just at the far side of the bridge, which spans a little stream and what were once fish ponds, but are now overgrown with reeds and become breeding places for the "molesting gnats and other small animals" that Palladio cautions his clients against, "which are generated by the putrefaction of still fenny waters." Beyond the gates there opens out another and greater rectangular lawn enclosed by trees and hedges, behind which run clear rivulets. Again, beyond these bounds there stretch the fields of the estate. Thus, as one stands in either of the south loggias, the eye commands an extensive and agreeable prospect. In this immediate region, flat and possessed of no striking natural beauty in itself, the villa and its grounds are so contrived that they make a spot of genuine delight to the eye.

The more one studies Palladio's country houses at first hand—and the Villa Cornaro is an admirable example to cite in support of this observation—the more is one filled with admiration for the ingenuity of the master who could use the same limited number of motifs and stock "properties" over and over again, and yet dispose them in ever new combinations, without repeating himself or incurring the risk of having one of his compositions mistaken for another.

Plaster Doorway in Great Hall

Plaster Decorations Framing Frescoes

Embellishments on Ground Floor, Made in Baroque Period of XVII Century

Ramp Design in Public Garages

By HAROLD F. BLANCHARD, AUTOMOTIVE ENGINEER

THIS is the second of a series of articles to be presented in THE FORUM *by members of the Consultation Committee on their respective subjects. Others of equal value and interest are in preparation.* — THE EDITOR.

THE popularity of the ramp as a means of inter-floor transportation has increased very rapidly in the last three or four years. There was a time when elevators were used almost exclusively for multi-storage garages, but it has been gradually realized that there is much to recommend the ramp for the transportation of self-propelled vehicles. The ramp obviously is much older than the elevator; in fact, it antedates the stairway. It is nothing more or less than an artificial hill, and consequently was man's first means of moving from one level to another. Then came the staircase which, however, was mainly suited for the inter-floor movement of human beings. As a means for moving goods its use was largely limited to what a man, or perhaps several men, could carry. Hence, the hoist was introduced and from that the elevator was developed. The freight elevator is a logical device for the movement of goods of all sorts, but the introduction of automotive vehicles, themselves possessing the power to climb or descend from floor to floor if a roadway was offered, changed the problem. This partly explains the growth of the use of the ramp.

The chief objection to the ramp is the fact that it often takes up considerable space. Just how much space it occupies depends on circumstances, including the size of the plot and how well the building is laid out. It also depends on the type of ramp used. At least one type of ramp, from a space-economy standpoint, compares very favorably with the single elevator. Even the ordinary ramp, although it often requires a great deal more space than a single elevator, has frequently been used because of the advantages it offers. It is cheaper to install and involves no upkeep cost. There are no moving parts and there is nothing to get out of order. It is part of the building itself; its capacity is almost unlimited. Cars may be run up or down in quick succession whereas the elevator has a very definite capacity limit.

Owners of automobiles invariably prefer the ramp because it provides quick and easy inter-floor transportation. There are no serious delays as with an elevator. The ramp is easily, instantly available. It makes every floor a straight floor. The objection to upper stories is almost completely removed. Owners and drivers of motor trucks are equally enthusiastic. In the storage of motor trucks it is almost a rule that all the trucks in the garage will go out within a period of half an hour or so in the morning and come in during a similar period at night. Because of this fact there must be means of handling a large capacity one-way traffic. The elevator is at its best when it is handling simultaneously two-way traffic, carrying a car up and bringing one down. The ramp is at its best when handling traffic in one direction, therefore the ramp is particularly desirable in a truck garage since it permits the emptying of a building in a few minutes in the morning and the filling of the building with equal ease at night.

In first approaching the question as to whether to use ramps or elevators it is necessary to consider whether one or more elevators will be necessary. Ordinarily one elevator will handle the work in a garage of 125-car capacity. In other words, if the building houses 500 cars, four elevators would be required. This figure, of course, must vary with different buildings and different requirements, but it is, nevertheless, a good average figure. One elevator would be sufficient for a garage having 150

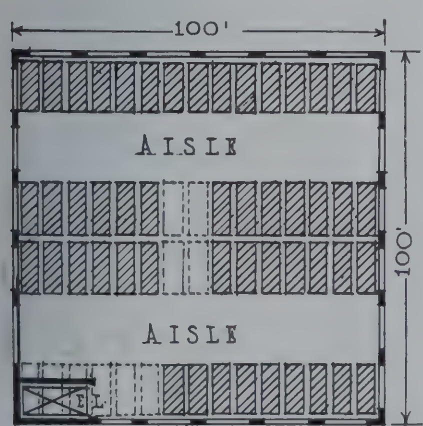


Fig. 1. Elevator Garage
Capacity 50 cars. Space for 6 cars occupied by elevator and approach

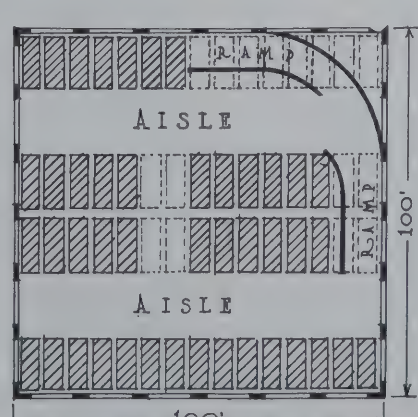


Fig. 2. Ramp Garage
Capacity 44 cars. Space for 12 cars occupied by ramp. Floor layouts vary

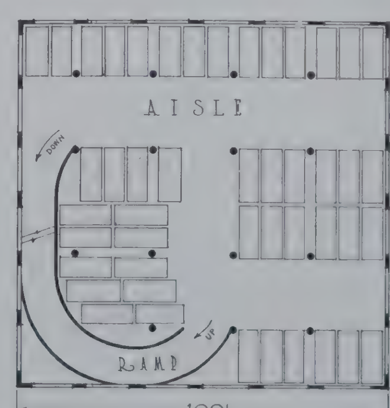


Fig. 3. Garage with Improved Ramp
Capacity 46 cars. Space for 10 cars occupied by ramp. Floor layouts identical

cars on three floors. Also a single-track ramp would be satisfactory for this building. Such a building would probably be 100 x 100. The elevator would be located in one corner and it would probably occupy a space which could be devoted to six cars. This figure includes the necessary approach to the elevator and it assumes an average elevator location; see Fig. 1.

A ramp design for the same building would probably vary from floor to floor but, on the average, it would occupy space which might be devoted to twelve cars. In other words, the ramp takes up six more car spaces than a single elevator. Notwithstanding this fact, the ramp is usually preferred because of the reduction in first cost, the absence of cost of upkeep, and the ideal service which it usually offers.

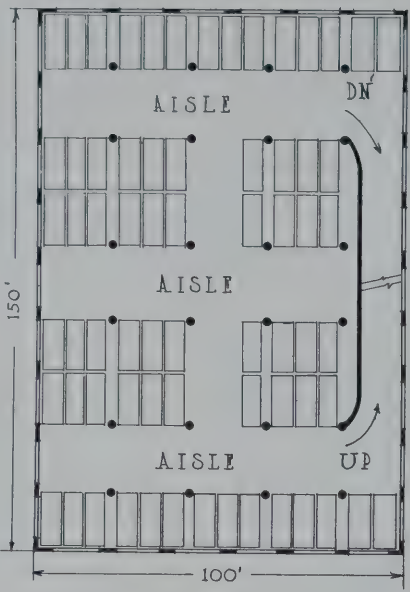
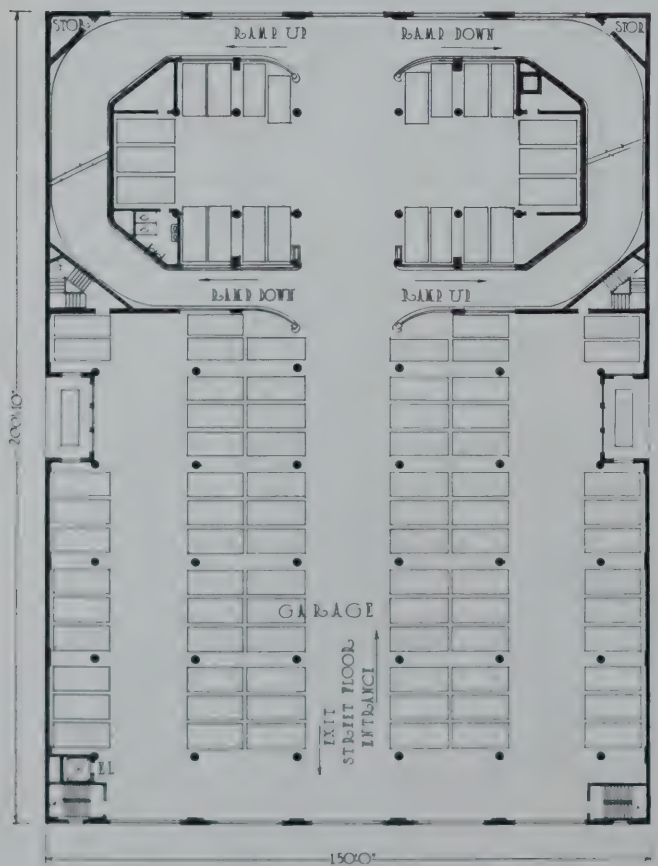


Fig. 4. Plan with Straight Ramp
This type is more economical in space than curved ramp but requires a floor depth of 150 feet

If a single elevator breaks down, the garage is out of business until it is repaired and for this reason a second elevator is often installed, adding to the expense. Advocates of the elevator often object that the ramp is not satisfactory because a broken down car cannot be taken up it. This is not true, however, because any good touring car is powerful enough to tow another machine up a 15 or 20 per cent ramp grade.

The ramp is often considered preferable to an elevator, even in a service station, because there are no parts to get out of order, no upkeep expense, and its capacity for transporting cars is much greater than the elevator's capacity. Furthermore, it is easier to tow a disabled car up the ramp directly into the repair shop than it is to disconnect the tow car at the elevator, raise the disabled car to the designated floor, and then remove it from the elevator. This is particularly true when one end of the car is so badly smashed that it must be lifted by the tow car.

The ramp has an advantage in the eyes of the average garage operator which cannot be calculated in dollars and cents. It is a sales talking point, the importance of which cannot be overestimated. However, if it is desired to make a comparison between a ramp and an elevator on a strictly economic basis, it is easily done, although the exact figures must vary according to the elevator considered, the height of the



Floor Capacity 99 Cars

Fig. 5. Exterior and Plan Commodore-Biltmore Garage, New York
Warren & Wetmore, Architect

building, and so on. Nevertheless, for an average case it may be assumed that the elevator costs $5,000, that repairs and depreciation per year will total $500, and that the cost of electric current will be $750. The interest on the investment at 6 per cent will be $300, making a total annual expense of $1,550. To this must be added the salaries of the elevator operators, if necessary. The usable space that the elevator occupies in a building should also be added to the expense. In other words, if the elevator takes up space sufficient for six cars per floor the rent that might be obtained from these spaces should be figured in. On the other hand, the cost of the ramp is entirely represented by the cost of the usable space it occupies. It is not fair to figure, in the case of the ramp, any addition for construction because the ramp will cost no more than equivalent floor space secured by ordinary building construction.

View of Ramp along Rear Wall, Commodore-Biltmore Garage
Warren & Wetmore, Architects

Many interesting facts have been developed regarding ramps within the past few years and from an examination of buildings already erected it may be said that few ramps have been laid out so as to fit their buildings as economically as possible. Here is a subject that demands the closest study, because the revenue to be obtained from the building depends upon how many cars can be stored in it. The design of the garage, by the way, is different from that of most other buildings because automobiles are large, bulky objects which can only be moved forward or backward. The conditions, therefore, under which a garage operates are very different from those found in an office or a factory. The ramp or elevator location and column spacing mean everything in a garage, whereas they mean comparatively little in a factory or an office building.

Many hold the view that a ramp is only suited to a large building, but it may be said positively that there are few buildings which are so small that they may not include a ramp properly designed. Perhaps the quickest way to get at the question of efficient ramp design is to consider the faults of some typical layouts that have been developed.

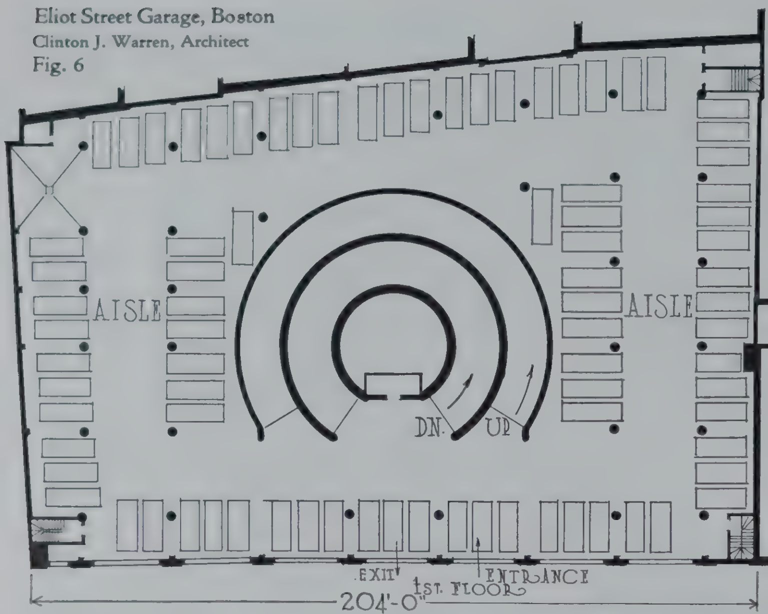
Fig. 2 shows the usual design for a building 100 x 100. This layout is for the second floor. The ramp rises along the right side of the building, from the first floor front, and swings in under the rear aisle. A continuation of this ramp goes on up to the third floor and perhaps from there to the fourth. It will be noted that the entrance to each floor is at a different point because of the type of ramp used; also, on the second floor the ramp takes off a slice of one side and one end of the building. This naturally has a serious effect on car storage. It subtracts space from all floors, but unfortunately the space subtracted is different on every floor. In other words, a ramp of this design raises havoc with the layout. The layout on every floor must be different, and yet the columns of all floors must have the same location. The objection, therefore, to this design, and to many ramp designs, is the fact that the floor pattern is different on every floor. Therefore, the desirability of so locating the ramp that it gives a uniform floor layout is a matter of prime importance. In the building in question, the easiest way of achieving this result would be as shown in Fig. 3. In fact it might be said, as a rule, that wherever a uniform floor pattern is desired it may be obtained by locating the ramp system as a flight of stairs and using the aisles to travel from one ramp to the next. The objection to both plans, Figs. 2 and 3, is that the curving of the ramp takes up a great deal of useful space. Therefore, it must be concluded that the straighter the ramp the less space it will occupy. It is difficult to make a straight ramp of ordinary design fit in a building 100 x 100. It is quite feasible, however, to place a straight ramp in a building 100 x 150, as shown in Fig. 4.

Fig. 5 shows the floor plan of the Commodore-Biltmore Garage in New York. This garage is of interest because it is one of the first to have a uniform floor pattern, and the layout shown is typical of all floors as far as the ramp is concerned. One ramp is for up traffic and the other for down. A car entering the garage swings to the right, up a ramp to the second floor, where it crosses the center aisle and reaches the third floor by way of a ramp on the left hand side of the building. Crossing the center aisle again it reaches the fourth floor up a ramp on the right hand side. The down ramps are alternately placed between these up ramps; there-

fore, a car coming down from the fourth floor would take a ramp on the left hand side to the third floor, and then on the right hand side to the second floor, thence on the left hand side to the ground floor.

This ramp design is excellent from an operating standpoint, excepting that the turns happen to be a trifle too sharp, the result being that large cars are likely to scrape their fenders. There are few garage locations where this would happen. In this section of New York, however, large cars are the rule rather than the exception. In many parts of the country this ramp design would be more than ample as far as turns are concerned, the occasional large cars being placed on the ground floor. This ramp gives easy access to the upper floors and there is little interference between up and down traffic streams. The ramp is open to the objection, however, that by its very nature it must be made long—too long. In other words, the grade must be made much less than it need be. There is also considerable waste space at the turns. The grade is about 8 per cent where it may be twice this figure. A close study of the layout will show that it would be impossible to use this ramp design on the plot shown, and yet alter the dimensions so that a steeper grade might be employed to give more car storage.

Eliot Street Garage, Boston
Clinton J. Warren, Architect
Fig. 6



Start of Ramp in LaSalle Garage Showing Fire Door
Holabird & Roche, Architects

The steeper the ramp grade is, the shorter the ramp becomes, and therefore the less space it occupies. Consequently, it is desirable to make the ramp as steep as possible and yet not too steep to be fully satisfactory. For a passenger car garage there is no reason why the grade should be less than 15 per cent and 20 per cent is not entirely objectionable, although 20 per cent is about the limit. A 20 per cent grade, by the way, is as steep an incline as the average car in good condition can ascend on second gear.

Another garage design that has attracted a great deal of interest is the Eliot Street Garage in Boston, Fig. 6. Two concentric ramps are placed in the center of the building—one ramp for up traffic and another for down traffic. The circular space inside the inner ramp is not utilized. Traffic on both ramps is in the same direction, which feat is accomplished by sloping the inner and outer ramps in opposite directions instead of in the same direction, as might be expected. The ramp system is ideal from an operating standpoint. There is no conflict in traffic stream. When a car enters the building it can move directly on to the up ramp to the upper floors, or on the down ramp to the basement. Both these openings are facing the driver. Likewise, in going down, the car proceeds straight out of the building or, in coming up from the basement, it goes straight out. It will be seen, therefore, that no matter what the path of the car, it does not cross the path of any other car. This is an advantage when traffic is heavy, although it is an advantage which is often overestimated as to its importance. A car in moving up or down through the building moves a certain distance on the main aisle once each revolution. It will be noted that the paths of up and down cars are entirely separate. There is no conflict of motion.

The disadvantage of this design is due to the enormous amount of space that the ramp takes up. The outside ramp is approximately 90 feet in diameter, which is to be expected inasmuch as the inside ramp has a circle of about 60 feet. The

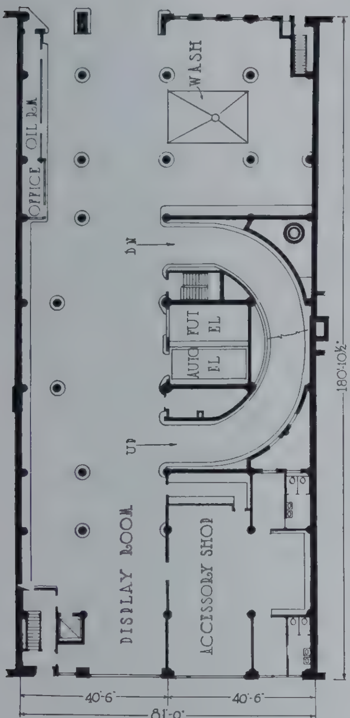


Fig. 7. First Floor Plan, LaSalle Garage, Chicago

Exterior of LaSalle Garage, Washington Street, Chicago
Holabird & Roche, Architects

ramps are broader than necessary. This plan illustrates one of the defects of the concentric arrangement of up and down ramps. In a large city garage it is hardly feasible to make the turning circle of less than 60 feet, and this, of course, applies to the inside ramp; yet if this is done the diameter of the outside ramp cannot be less than 80 feet, assuming that the ramps are 10 feet in width. Obviously, a circle 80 feet in diameter is a large space to devote to inter-floor transportation.

The LaSalle Street Garage in Chicago, Fig. 7, contains a noteworthy feature in that a ramp is used for traffic in one direction and an elevator for traffic the other way. In the morning, when the heavy traffic is *up*, the elevator is used for light *down* traffic, and at night, when *down* traffic is high the elevator is used for light *up* traffic. This garage is used largely by men who drive to business; if it were in a residential section the traffic streams would be in just the reverse directions. This elevator and ramp combination has much to recommend it, but it is a mistake to think that it suits all buildings. In small and medium sized garages a single ramp without an elevator is enough. The same ramp will serve quite satisfactorily for up and down traffic. On the other hand, very large garages will require separate ramps for the two traffic streams. The ramp and elevator combination, however, is deal for all large garages where traffic is heavy in only one direction. Traffic in the other direction, being small, can be handled by a single elevator. The ramp design in this garage is rather wasteful of space, occupying area useful for storing cars.

Where a building is long and narrow, say of 50 or 60 feet frontage and 150 or 200 feet in depth, an ordinary ramp may be placed as shown in Fig. 8. The ramp starts at one side of the building, swings around to the end and then up the other side and,

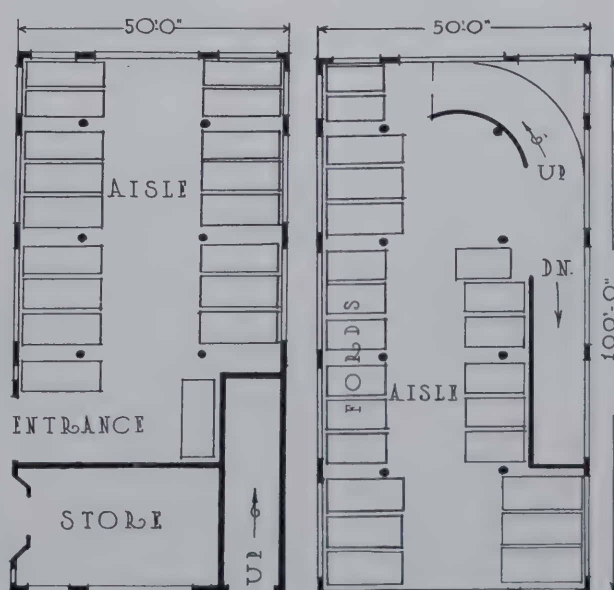


Fig. 8. First and Second Floor Plans Showing Efficient Design of Ramp in Narrow Building

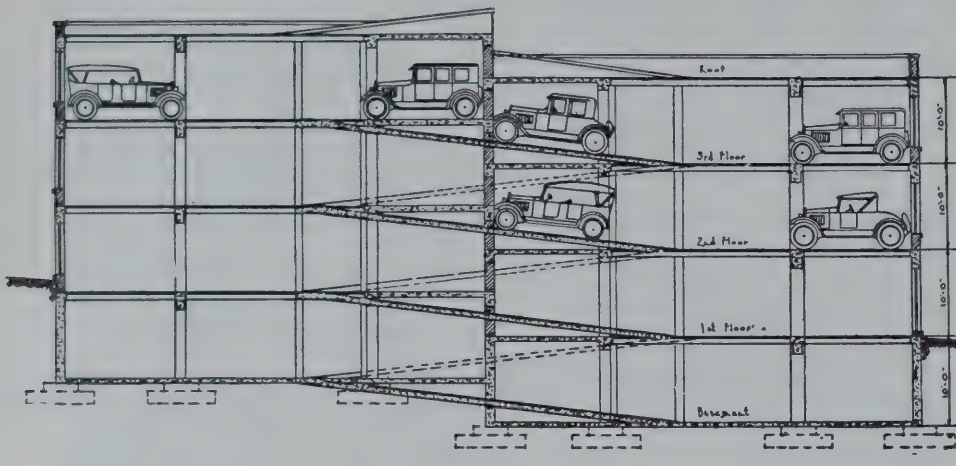


Fig. 9. Section through Garage Showing Patent Ramp Design with Staggered Floors

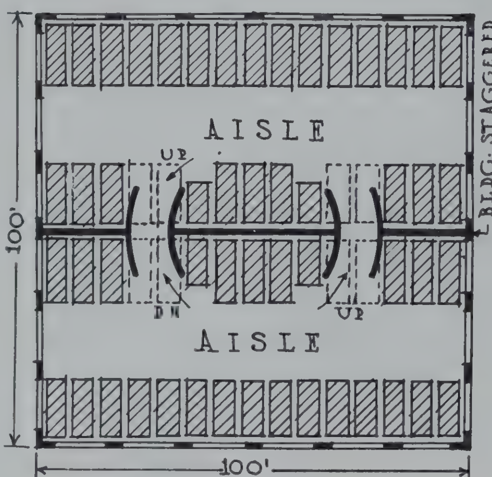


Fig. 10. Typical Floor Plan of Garage with Patent Ramp Design and Staggered Floors. Capacity per Floor 52 Cars

if the building is high enough, may circle around the front. At first glance this seems to be an inefficient design, but it works out well in buildings that are 60 or 70 feet wide. In fact it works out better in buildings of this width than it does in some larger buildings.

Where possible, it is advisable to make the turning circle 60 feet in diameter, but if the building is narrower there is no serious objection to using a smaller circle; in other words, if a building is 50 feet in width, obviously the circle cannot be any more than this diameter. The majority of cars made today will turn in a 50-foot circle, and in many towns practically all cars to be stored in the garage will turn within this circle. The few cars turning in a larger circle may be placed on the first floor. There are really very few automobiles built today which require more than a 50-foot circle, and there is only one machine now being manufactured that requires more than 60 feet and that is the Locomobile. It is poor economics, however, to design a building for Locomobiles, when it is considered that their number is so small that many garages in the country will never be called upon to house a car of this make.

The width of the ramp curb should be from 9 to 12 inches; the outside curb had best be made 12 inches and the inside 9 inches, and it is advisable to make the inside curb 9 or 10 inches high. The distance between curbs should be 8 or 9 feet, making the total width of the ramp 10 or 11 feet.

In truck garages the ramp circle need not be over 80 feet and many truck garages are designed with a 60-foot ramp curve. There are some trucks that require more than 80 feet to turn in, and many require more than 60 feet, but it is assumed that these trucks will be stored on the ground floor. It should be obvious that the larger the circle the more space the ramp must take up, and this holds true whether the ramp is a complete circle or is built as straight as possible. Therefore, every effort should be made to keep the circle as small as possible and still satisfy requirements.

Within the past two or three years patents have been issued on several special ramp designs, among which may be mentioned a design in which the whole floor of the garage slopes. Originally this design was helical in form but eventually it was modified to fit a square building. It is much more economical of space than the ordinary ramp design, but it possesses the disadvantage of having a sloping floor and special steelwork and forms must be used throughout.

Fig. 9 shows a patented design in which the building is divided into two parts, the floors in the two sections being staggered. In most cases the floors of one section come halfway between the floors of the other section, although where equal length ramps are used the floor spacing may be changed.

The floors in the two sections are connected by inclined passages or ramps, each ramp rising one-half story at a time. The path of a car going up through the building from the street would, therefore, be from the first floor in the first section up a ramp to the first floor in the second section one-half story above, and from thence up a ramp to the second floor in the first section and so on. The ramps in this system are half the usual length and, therefore, the system is particularly suited to small buildings; in fact there are few buildings so small but that this ramp system can be used satisfactorily. Cutting the length of the ramp in half makes it almost as easy to locate the ramp in this system as it is to locate an elevator in the building. In other words, the building may be laid out first and the ramp located afterwards, whereas with the ordinary ramp it is almost necessary to fit the ramps in first and then decide how the cars are to be arranged.

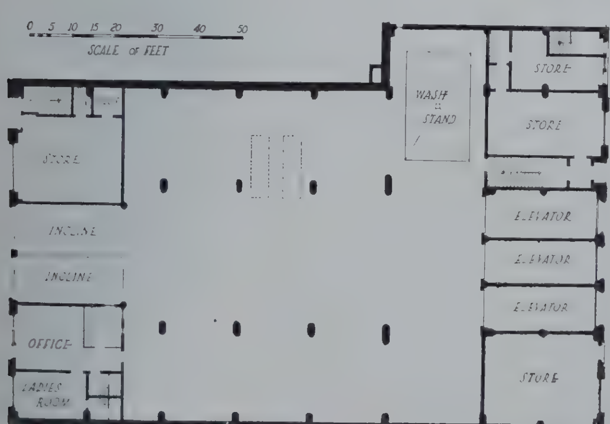
One of the most important features of this ramp is that it rarely takes up more space than a single

elevator, or rather a building equipped with this system has as much or more storage space than it would have with one elevator. The two are compared in Figs. 2 and 10. It will be noted that the economy of this system lies in the fact that the space used for a connecting passageway in Fig. 1 becomes a ramp in Fig. 10; therefore this space does double duty. It also permits the use of the same layout pattern on all floors. Another advantage is that the ramps may be open. It is not necessary to box them in as is usually done with a long ramp. The open sides make it easier for a driver to see. It is necessary to wall in the ordinary ramp in order to obtain fire protection, a rolling door going on one end of the tunnel. With the arrangement shown in Fig. 10 a dividing fire wall is part of the building design and the fire doors are located in line with this wall; therefore, it is not necessary to wall in the ramps. The dividing wall greatly reduces the insurance, and this as well as other features helps reduce the slight additional cost because of this construction.

The most usual mistakes in designing ramps deserve special attention. In the first place, it is quite frequent to find a double-track ramp where a single-track ramp would do. There are few garages that are large enough to require separate tracks for up and down traffic. In the ordinary garage, housing 200 or 300 cars, a single-track ramp is ample.

Ramps of ample size are sometimes designed with right-angle corners which are extremely difficult to negotiate. If a right-angle turn is used it is advisable to curve the curb to guide the car, and if this is not done, at least the turn should be ample enough so that there will be no difficulty about scraping fenders on the walls of the garage. On the other hand, many ramps are designed with turns that are so ample that much valuable space is wasted. A tiled line in the floor and leading up the center of the ramp is an excellent guide for motorists.

It is sometimes said that ramps are dangerous. However, it is questionable as to whether any ramp is as much of a menace as an elevator with its open shaft. It is true that a car may get out of control on a ramp, but as a matter of practical experience brakes have to be in extremely bad shape to be so ineffective as to permit a car to run away on a 15 or 20 per cent grade. Those who doubt this statement should make a practical test of the matter. Looking at the question from another angle, no car has any business on the highways if its brakes are not sufficiently powerful to hold it on a 20 per cent grade. In the hilly sections of the country 20 per cent grades are frequently encountered and there is never any complaint among motorists in ascending or descending inclines of this degree of steepness, nor will they complain when a hill of this degree is found in a garage.



THIS garage contains space for about 444 cars, or about 82 to a typical upper floor with none in the distributing aisles. Each floor is provided with apparatus for washing two cars at one time, and the elevators extend to the roof.

PORTLAND STREET GARAGE, BOSTON, MASS.
ANDREWS, RANTOUL & JONES, ARCHITECTS

General Business Conditions and Building

THERE is particular reason at this time for architects' keeping in close touch with general business conditions. Changes are taking place rapidly, but they are not occurring simultaneously in all industries nor to the same extent in all sections of the country, and inasmuch as the development of building depends to so large a degree upon the general attitude of business men and in recognizing opportunities for securing favorable conditions in materials and labor, it is definitely to the advantage of the architect to know the relative conditions of different industries and general price movements so that he may apply his energies where they will be most productive.

For many months the building industry has made probably the least favorable showing. It is, therefore, a distinct encouragement to note that building conditions in the fall months have shown a very appreciable improvement. An index of present activity is had from the total represented by contracts awarded in the 27 Northeastern states, as reported by the F. W. Dodge Company. This total is $246,186,000, the largest monthly total in the current year, and a record for September in any year. This shows a gain of 11½ per cent over the total for August, which itself was 14½ per cent greater than the average value of contracts let in the month of September during the last ten years.

Although price reductions have been important, a contributing factor of perhaps equal importance to this gain is the renewed confidence brought about by general economic improvement. Forced liquidation of stocks is completed as attested by the index numbers of wholesale commodity prices. Bradstreet's index records the first upward turn in more than a year on July 1 and a further slight increase has been shown in each subsequent month.

The activity noted in building this fall has been reflected, to a greater or less extent, in raw materials and in industrial lines, but it is not generally agreed that the present activity necessarily is the beginning of continued improved conditions. There is an element of seasonal demand, which must be recognized as contributing considerable reason for the present favorable conditions. Steady business in practically all lines is dependent upon the stabilization of prices, and there is as yet no assurance that present prices are stabilized, but the average tendency of prices, not only in the United States but in foreign countries as well, toward a slight rise or continuance on a level, would indicate that further changes in the price situation would be brought about comparatively slowly.

In connection with materials used in building, reports that reach us indicate smaller stocks on hand than is usual at this time of year and likewise a comparatively brisk demand, which conditions, of course, are favorable to maintaining prices on a firm basis. Thus the shipments of Portland cement during the third quarter of this year established a record, approximately 33,970,000 barrels being distributed in that time. Production likewise in this quarter established a record, yet the stocks on hand for the month of September showed 135,000 barrels less than the average September stocks for the last five years. A large portion of this cement is going into the construction of concrete roads, it being estimated that possibly 20 per cent of the output is used in this work. The remainder, however, is largely used in the building trades and provides an indication of the very large amount of building that has been put under way.

In the brick industry the same conditions may be observed, the relation between orders on hand and stocks showing steady improvement in the demand for brick, and this has resulted in not necessarily an increase in the price of brick but an equalization of prices. In the report of the common brick industry for the month of September the composite price is quoted at $13.80 as compared with $13.87 for August, but the variation between the highest and the lowest prices has been greatly reduced from that of previous months. In the steel industry the increase in the tonnage of unfilled orders of the Steel Corporation, as reported September 30, is the first monthly increase since July, 1920, and offers further evidence of definitely better business conditions. Money is becoming cheaper, and this should continue owing to the very excellent condition of the banking situation. In the bond market interest rates are decidedly lower than earlier in the year, and money for their purchase is plentiful. This condition is favorable to easier funds for building construction because the margin of return between short and long term securities is gradually lessening. Indication of the country's financial strength is seen in the report of the Guaranty Trust Company for October 31, which reports that in the first nine months of 1921 some $756,000,000 in new state and municipal bonds was placed on the market, which is well above the previous record of $520,000,000 for the same period in 1919, and that during the month of October an additional offering of $60,000,000 in federal farm loan bonds was well received.

All of these factors are bringing nearer a realization of the general activity which is needed in building in order to make up the deficiencies in construction which the recent Unemployment Conference found was estimated in value at from 10 to 20 billions. They mean that building which has long been contemplated will begin to take definite form, and architects, as their particular responsibility, should exert every effort to follow the trend of prices in materials and labor, the available stocks and their location in view of transportation costs, so that they will be in a position to provide their clients with every advantage of lowest cost.

SMITH MEMORIAL HALL, UNIVERSITY OF ILLINOIS, URBANA, ILL.

JAMES M. WHITE, ARCHITECT

G. E. WRIGHT, ASSOCIATE ARCHITECT

DETAIL OF MAIN FACADE

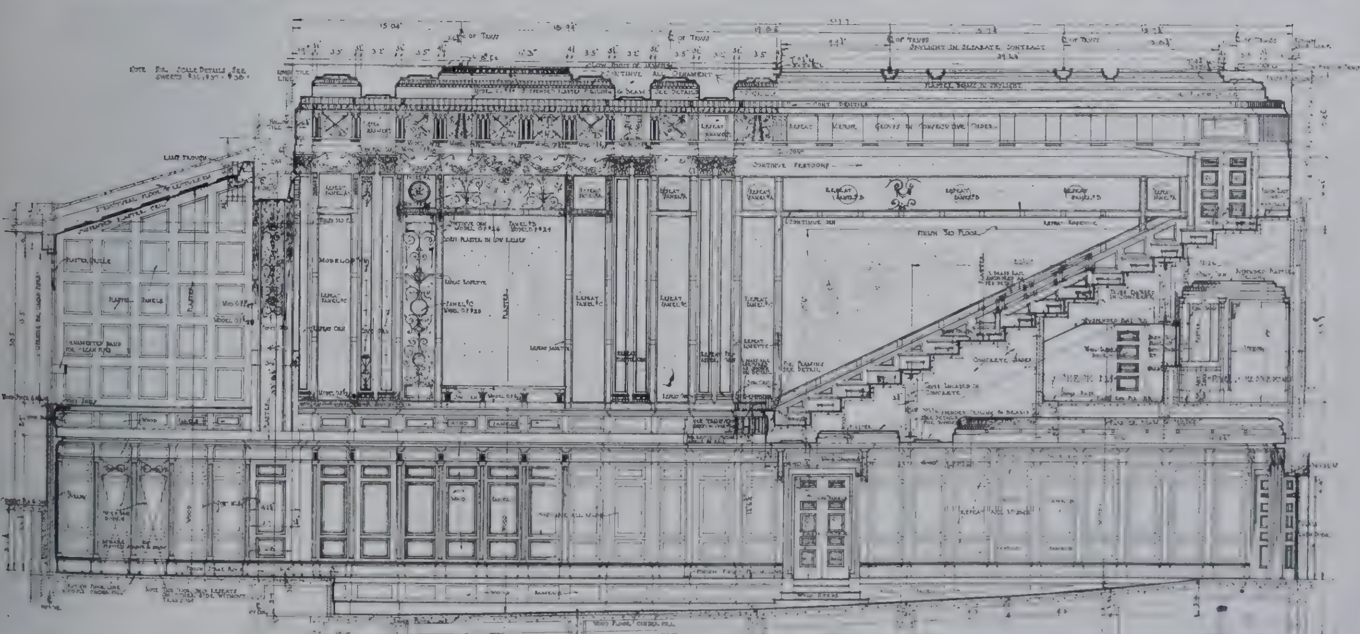
DETAIL OF MINOR ENTRANCE

SMITH MEMORIAL HALL, UNIVERSITY OF ILLINOIS, URBANA, ILL.

JAMES M. WHITE, ARCHITECT

G. E. WRIGHT, ASSOCIATE ARCHITECT

VIEW OF AUDITORIUM TOWARD STAGE



LONGITUDINAL SECTION THROUGH AUDITORIUM

SMITH MEMORIAL HALL, UNIVERSITY OF ILLINOIS, URBANA, ILL.

JAMES M. WHITE, ARCHITECT

G. E. WRIGHT, ASSOCIATE ARCHITECT

A Western School of Music

SMITH MEMORIAL HALL AT UNIVERSITY OF ILLINOIS

By WILLIAM MACY STANTON

FIFTY years are but a day in the history of the pyramids of Egypt or the Parthenon at Athens or even in that of certain of the old universities of Europe, but in the past 50 years there has grown up in the corn belt of the Middle West a great university. Set down in the vast, fertile prairie, 128 miles from Chicago, is the University of Illinois,—53 years ago an infant university, established by an act of the state legislature,—today a great modern university of 8,000 students, whose homes are located in every state in the union and in almost all foreign countries. Its scholastic standing is long established and recognized throughout the educational world; its athletic teams have been victorious in meets and contests everywhere. The growth of the university may be said to typify the development of the part of the country where it is located.

Illinois, one of the richest states in the union, supports the university by generous appropriations, so the tuition is a very nominal sum, well within the reach of every aspiring boy or girl. The land is acquired, buildings are erected, and equipment purchased out of state funds. It is therefore unusual to find at such an institution a personal gift such as the Smith Memorial Building. Having been in use only one school year, this building stands as one of the newest on the campus.

Captain Thomas J. Smith, a former member of the Board of Trustees of the University, gave toward the funds for the erection of this building which was to be known as the Smith Memorial Music School, and to be dedicated to the memory of his wife, Tina Weedon Smith. She had loved music and had devoted her life to the uplift of musical education and desired that this education be available to all classes of people.

The Smith Memorial Building is located on the campus at the southeast corner of the present quadrangle, close to the university auditorium. The architecture of the auditorium dictated the style, and in a certain sense the feeling of the whole building, as the cornice heights are the same in both buildings. Brick, the logical building material for this clay country, was used, with Indiana limestone trim. The brick surfaces are relieved in places by polychrome tile and marble inserts. The Italian renaissance style was used wherever it did not conflict too seriously with the lines and materials of the auditorium. One request of Captain Smith was a Memorial Room in which portraits of himself and his wife would be permanently hung, and this room is located on the second floor in front of the recital hall, with its windows facing into the portico.

In this modern, well equipped Memorial Building is housed the School of Music of the University of Illinois. Completely separated from all the great musical centers of the country and hundreds of miles from New York, this school of music has grown up and now flourishes in a modern temple dedicated to its study.

View of Smith Memorial Hall from the University Campus
James M. White, Architect, G. E. Wright, Associate Architect

Soundproofing a Building

STUDY OF RESULTS AT SMITH MEMORIAL HALL, UNIVERSITY OF ILLINOIS

JAMES M. WHITE, *Supervising Architect of the University.* G. E. WRIGHT, *Associate Architect*

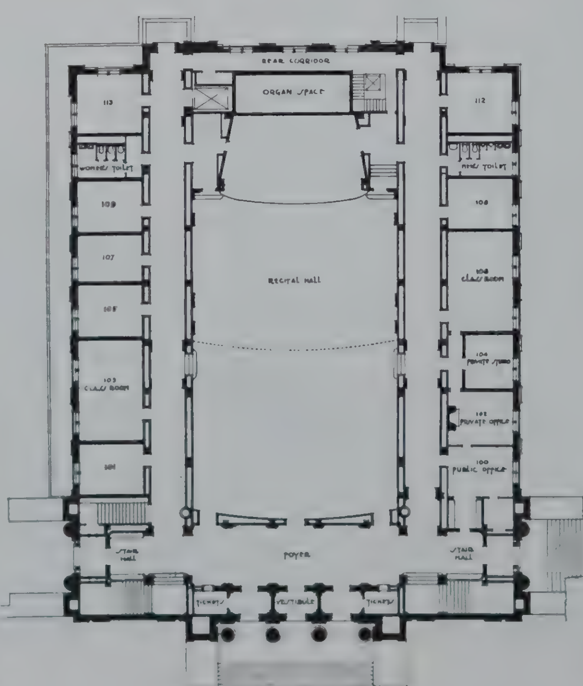
By F. R. WATSON, *Professor of Experimental Physics, University of Illinois*

THE Smith Memorial Music Building was built to accommodate the School of Music at the University of Illinois. It is a reinforced concrete structure, containing two stories with an attic space and basement. The total floor area is 65,641 square feet, and the volume 1,146,812 cubic feet. For the purposes of instruction in music, a number of special features were needed, such as practice rooms for students, studios for instructors, and a concert hall for recitals. In view of the varied nature of the music and the likelihood of discord, it was especially desired that the different rooms be separated by soundproofing. It was also of importance that the concert hall be designed acoustically so that music could be rendered under the most favorable conditions.

In view of these demands, and also because of a personal interest in the matter, a collaborative investigation of the problem was conducted by the architects and the writer. An effort was made to soundproof the building throughout. This involved the insulation of 45 small practice rooms in the attic, 21 studios and classrooms on the first and second floors, and the large concert hall. An effort was also made to reduce noises due to fans, motors and elevators. The various systems of steam pipes, electric conduits and ventilation ducts were installed in special ways to minimize the possibility of their transmitting sound. The building has been in use for several months, so that a statement may now be made concerning the outcome of the venture. While the essential objects sought for appear to have been attained with a fair degree of success, this account is written to set forth the features of the construction and to discuss their effects, advantageous or otherwise, in controlling sound.

Before describing the acoustic details, it appears desirable to give some account of the action of sound in a building and thus make apparent the reasons for adopting the various methods of construction.

ACTION OF SOUND WAVES IN A BUILDING. Sound consists of a series of pressure pulses that travel through the air or in the solid structure of a building. Two types of sound should be considered. The first type includes sounds that are generated in the air by a violin, the human voice, etc., which travel through the air to the boundaries of the room. Such sounds are reflected to a marked degree by continuous walls of some rigidity. Where an air passage is presented, however, such as a ventilation pipe or an open window or door, the sound waves pass readily on through until they meet some solid obstruction. If the air passages from a room are suitably guarded, the sound may be confined to the room and absorbed by rugs, furniture and walls. The second type of sound originates in the vibrations from a piano, cello or other instrument that comes into intimate contact with the building structure. These vibrations proceed readily through the continuity of structure to all parts of a building, setting up air vibrations (sound) whenever a wall or other construction member responds markedly to the traveling vibrations. To stop these waves, it is necessary to interpose in their path a substance or construction having a decided change in elasticity or density. An air space in masonry construction would be a very efficient obstacle, provided the air space were continuous and not bridged over by any solid structure. Since this is practically impossible in buildings with any degree of rigidity, recourse must be had to special devices such as soundproof partitions and floating floors that interpose layers of hair felt or other air-filled material. If the vibrations can be made to pass from solid structure into the air, they may be absorbed largely by felt or similar material. With these considerations in mind, the efficiency of the various constructions is more readily understood.

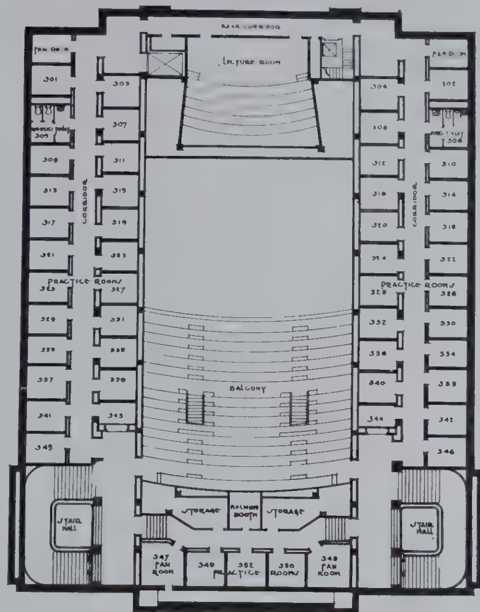


First Floor Plan

DETAILS OF CONSTRUCTION. The framework of the Smith Memorial Music Building is constructed of reinforced concrete with combination tile and concrete joist floor construction, thus giving a massive, rigid structure not easily affected by vibrations. The soundproofing of rooms involved an application of the principles set forth in

the previous paragraphs but in conformity with the restrictions imposed by practical building requirements. Each room was treated as a unit and was insulated at the floor, ceiling and walls, except outside walls.

PARTITIONS. The partitions between rooms are constructed of two 3-inch gypsum block members separated by a 2-inch air space that contains a layer of sound-absorbing material. The method of construction was interesting. First, one 3-inch member was built up complete. Wood strips were nailed to this and the layer of patent sound-absorber was tacked to the wood strips so as to leave no open joints. Then the second member was built, attention being paid in the construction to prevent contact between the gypsum blocks or the mortar at the joints with the sound-absorber on the first member. Both of these 3-inch members rest on machinery cork, thus breaking the intimate plaster contact with the floor construction. They are insulated from the floor above by hair felt. At the outside walls the partitions project into a 4-inch chase insulated by hair felt, thus guarding against possible crack openings. Contact between the partitions and columns, beams, etc., is avoided by the interposition of hair felt. This arrangement places the patent sound-absorber or hair felt as an obstacle to transmission of sound, particularly if cracks or openings develop in the partitions.



Attic Plan

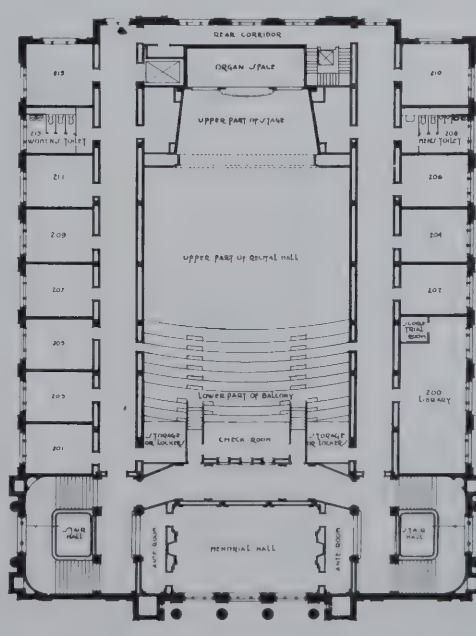
FLOOR CONSTRUCTION. The structural floors are composed of reinforced concrete 12 inches thick with 10-inch hollow tile inserted to reduce the weight. Wooden planks were set in place so as to make a structural break under each room partition. This arrangement assists in making each room an insulated unit.

From the structural floor up, the details of construction are: a 1-inch layer of dry sand, 2 inches of cinder concrete fill with cement topping, a layer of uncoated builder's felt, and finally linoleum. The sand serves to break the continuity of the structure between the finished floor and the structural floor.

CEILINGS. Suspended ceilings of metal lath and plaster are installed in the practice rooms on the third floor. While these ceilings are thin, compared with the walls, it is assumed that any sound transmitted through them will be absorbed to a considerable extent in the attic space and will have to pass through a second ceiling before reaching the interior of another room. Double windows in the ceilings allow light to enter from skylights. The ceilings of the studios on the lower floors consist of two coats of plaster on the underside of the structural floor. These will be covered with sound-absorbing material, where it is found desirable, to reduce the reverberation in the room.

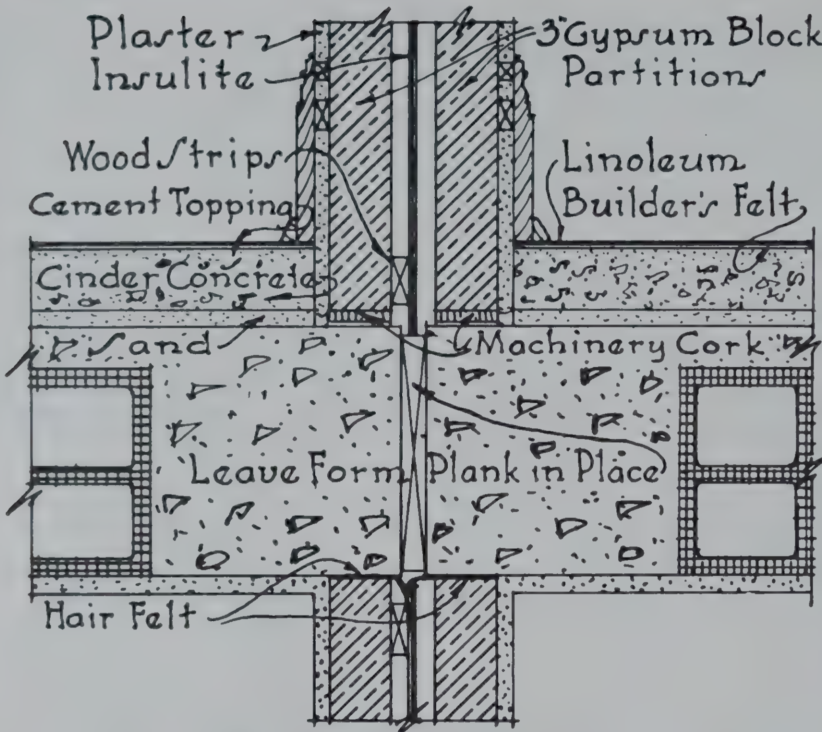
DOORS, TRANSOMS AND WINDOWS. All studios and practice rooms are equipped with a special soundproof door of heavy double construction with a 1-inch thickness of hair felt in the center. It makes a tight closure all around against felt stops and, by means of a lever door handle, presses a felt stop down so as to close the threshold crack.

An accompanying diagram shows the construction of the frames for the soundproof doors and transoms. The woodwork is backed with heavy felt to avoid direct openings through which sound might pass behind the finished jambs from the room to the corridor outside. All transoms are fixed and are set in rabbets 1 inch deep, being pushed tightly against a heavy, tubular wool felt. This felt is held in place with removable wedge-shaped strips so that it may be replaced with new felt when desired. The transoms are double-glazed, with the glass panes set in felt. The double windows in the ceilings of practice rooms are insulated in much the same manner.



Second Floor Plan

PIPES FOR LIGHTING AND HEATING. A special study was made of the placing of pipes to avoid possibility of easy transfer of sound. Electrical wire conduits are carried in vertical shafts in outside or corridor walls,



Detail Showing Floor and Partition Construction

with wall plug outlets in each room. This obviates making outlets in the ceilings and floors, according to usual practice, and reduces the leakage of sound. Steam pipes for heating are housed in chases in the brick walls, the chases being filled with sponge felt to prevent transmission of sound vertically. The steam radiators are bracketed from the outside walls and do not touch the floor, thus lessening the chance that floor vibrations from pianos will enter the metal heating system. Attic rooms are heated by warm air and therefore are not connected with the steam heating system.

The Ventilation System. There are four separate ventilation systems that furnish washed, fresh air to the various rooms in the building. It is therefore unnecessary to open windows for fresh air, and the escape of sound through these open vents is made impossible. Having four systems lessens the chance of transmission of sound between different parts of the building. One system supplies the studios and classrooms on the first and second floors. A separate supply duct leads from the main duct to each room. A second system ventilates the concert hall. The practice rooms in the attic are arranged in two groups, each group being supplied with air from a separate system, which serves also for heating. Individual outlet ducts convey used air from each room to the upper attic space, where it leaves the building.

Corridors and Halls. The floors of the passageways in the building are covered with cork or linoleum to deaden the sound of footsteps. Swinging doors are installed in several places to minimize transfer of sound through the halls. The two elevator shafts are situated apart from music rooms and housed inside tile walls to avoid easy transfer of sound. Elevator doors are arranged to shut tightly. Ventilating fans are of slow velocity type to decrease noise, and are installed in special rooms.

Summary of Construction Details. It was the intention to insulate each room as far as possible to make it a separate unit. Since the greatest chance for leakage of sound appeared to be through the walls separating adjacent rooms, all such walls, floors and ceilings were left continuous without any breaks in the surface. Where it was necessary to have openings, these were placed in other walls. Ventilators and doors were located in the partitions facing the corridors. Electrical conduit and steam pipes were housed in outside or corridor walls. Windows were placed in doors or outside walls. This arrangement minimized the likelihood of sound transference directly from one room to another. Furthermore, any sound leaking through the openings for doors, windows, etc., would have to pass along a corridor and penetrate a second barrier to reach the interior of another room.

The Concert Hall. The concert hall is situated in the center of the building and is insulated from studios by surrounding corridors on the first and second floors. Practice rooms on the third floor are contiguous to two walls. Further insulation is provided by double walls consisting of two 4-inch hollow tile members separated by a 17-inch air space. These side walls are continuous to the roof, thus leaving no openings, except for tight closing doors, through which sound may pass.

A special study was made of the acoustical design of this hall. Since it was designed solely for music, the time of reverberation should be greater than for speaking. Accordingly, only a moderate amount of sound-absorbing material was prescribed, in accordance with Sabine's formula, and a considerable percentage of this absorption was secured by using upholstered seats. Ventilation grilles break the expanse of the ceiling surface. Two large panels in the side walls are to be covered with felt and a decorative tapestry cover.

The acoustic properties of this room are in accord with the expectations. Music of moderate intensity, such as chamber music or vocal solos, is rendered in a pleasing way. Musicians say that it is easy to sing in the room. The tones flow easily and with little effort. Heavy orchestras would be heard at a disadvantage, because the intensity would be too great. Speaking is also done at a disadvantage, because of the rather long period of reverberation. With a considerable audience present, the conditions for speaking are improved,

while the music is still heard advantageously. Director Erb, of the School of Music, reports that the hall is "perfect" for music. Arthur Beresford, whose experience as a baritone has given him a wide acquaintance with music halls, says that the "recital hall is the best in the country."

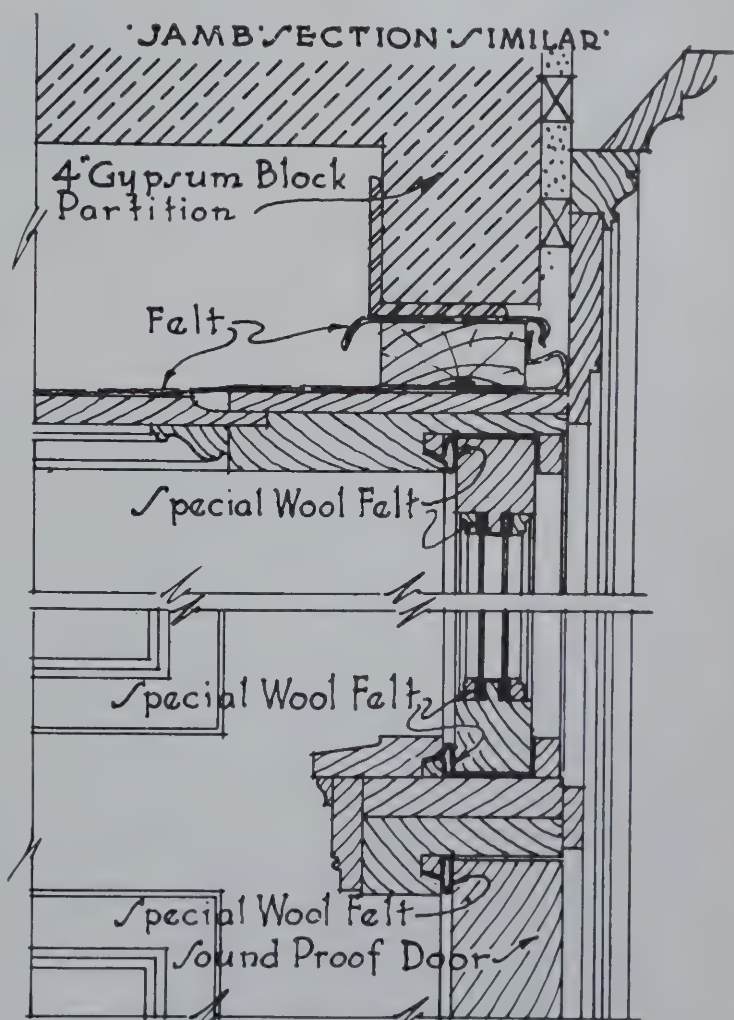
Experimental Investigations. Tests have been made of the efficiency of the soundproofing. One observer, inside a practice room with the door shut and speaking in a loud voice, can scarcely be heard by a second observer outside in the corridor. Music, however, penetrates the walls more easily, although it is greatly diminished in the transmission. Students in practice rooms say that they notice sounds from other rooms only when they stop practicing. The partitions are thus not absolutely soundproof but, for practical purposes, it appears that they need not be. The walls could have been made more effective but the construction would have been elaborate and costly and not in accordance with ordinary building requirements.

One of the severest tests given the partitions is by a small practice pipe organ in a studio on the first floor. When this organ is played, sound is transmitted to adjacent rooms. The double partition vibrates under the vigorous action of the sound waves. An observer in an adjacent room, by placing his ear or fingers against the partition, can hear or feel the varying pulses in different degrees, depending on the pitch of the tone and its intensity. He can also feel the vibrations in the floor. This transmitted sound, however, becomes of minor importance when a piano is played in the room.

Another test of the efficiency of the partitions was discovered accidentally. During an investigation, a sound of undue intensity could be heard in the halls of the building and in some of the studios. The sound was located readily in an unsuspected room on the third floor over the organ loft. Since this room was designed for lectures, it was not soundproofed as for music rooms. A piano placed temporarily in this room for practice purposes gave rise to sounds that quite easily penetrated the partitions and thus gave direct evidence of the desirability of double partitions. Sound also passed through the ventilators from this room to studios. Considerable sound could be heard in the hallways. This was to be expected, as already explained, by leakage of sound through doors, ventilator frames and other breaks which were purposely placed in the corridor partitions rather than in walls separating rooms. This confusion of sounds in the halls is not particularly objectionable, but it would probably be better if carpets were used or else sound-absorbing materials placed on corridor ceilings.

The concert hall is insulated by double walls and surrounded by corridors, except for practice rooms on the third floor. This arrangement appears to be effective. But little sound is transmitted from other parts of the building. The writer sat near the wall adjacent to the practice rooms and could detect faint sounds, but these appeared unimportant compared with music generated in the concert hall itself. Piano music in the third floor lecture room had easy access through ceiling ventilators and was objectionable.

The ventilation ducts allow a transfer of sound between different rooms in greater amount than the partitions. The use of separate ducts for each room minimizes the trouble, but greater insulation is to be desired. Ventilator stops with layers of sound padding have been tried with some effect, but further modifications are contemplated to reduce this leakage. One marked case of the transfer of sound by ventilation ducts was discovered between the lecture room on the third floor and a studio on the first floor. An inspection of the ventilating system revealed the reason. The outlets to the lecture room were of rather large area and left the main duct opposite the outlet to the studio. As a result, sound originating in either room traveled to the main duct, crossed it and entered the opposite duct where it proceeded readily to the other room. Except for this lecture room, the individual pipes lead-



Section through Door Head and Transom Bar

Note double glass in transom and special closing door on tubular felt strips

ing to studios proceed from the same side of the main duct with a lessened chance for intercommunication of sound.

The soundproof doors have not been entirely satisfactory. The success of the insulation depends on closing the door tightly, and this requires a considerable pressure on the patent door handle. People using the rooms do not always observe this requirement so that an aperture is left for the escape of sound. Possibly a door with an automatic closing device would prevent this trouble. A door is analogous to a single partition. Sound transmitted through a door to the corridor must pass through another door or wall to get into a second room.

Conclusions. The installation of special forms of construction in the building appears to have a decided effect in controlling and diminishing sound, although the effects are uneven. The building is not absolutely soundproof and the experience thus far indicates that it is not essential that it should be. Each room was insulated as thoroughly as possible; motors, fans and other machinery were selected from types that produced little noise; elevators were placed in separate housings.

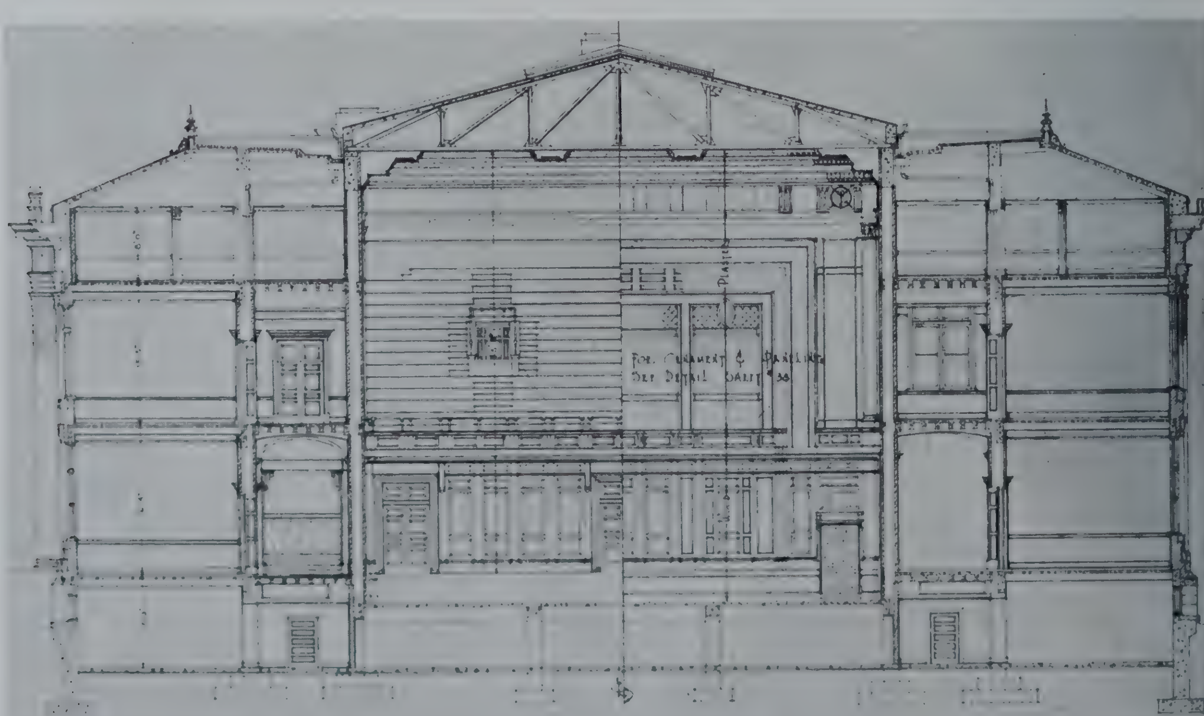
Sound travels easily through the continuity of building materials and its paths are not easily traced. With each room insulated, it is difficult for a generated sound to penetrate the insulation and a similar obstacle exists to its entrance into another room. In the meantime, while traversing the building structure, such a sound continually meets obstacles in its progress that reflect and absorb it until its energy is dissipated.

It is not easy experimentally to estimate with any great accuracy the separate effects of the various sound-insulating constructions. A person in a room can hear diminished musical sounds, but is unable to give confidently, in each case, the source of the leakage. The experiments show, directly and indirectly, the advantage of using continuous, unbroken walls, floors and ceilings between adjacent rooms. Making these walls double, with air spaces containing sound-absorbing material, adds to their efficiency.* Placing the necessary openings for doors, windows and ventilators in outside or corridor walls confines the leakage of sound largely to corridors, with a reduced possibility of transfer of sound between rooms.

Ventilation ducts, even with separate pipes to each room, do not appear to insulate sound as completely as double walls. Using separate ventilation systems for groups of rooms reduces the possibilities for transfer of sound between different parts of the building. Further investigation is desired to develop a more effective soundproof ventilation.

The concert hall, designed in accordance with the known facts of acoustics of auditoriums, possesses properties that assist in an acceptable manner in the pleasing production of music. Without commenting in further detail on the arrangement of pipes, doors, windows, etc., it may be said that the experiments in this building show some of the features necessary for effective control of sound, and that while there is much more to be learned, enough has been discovered to lend support to the belief that soundproofing in buildings may be prescribed in the not distant future with some of the certainty that now attends the acoustic design of auditoriums.

*The plaster partition members of these double walls should possess, as far as possible, the desirable qualities of mass, rigidity and freedom from vibration as described in The Architectural Forum for June, 1920



Transverse Section through Recital Hall, Half Showing Stage and Half Balcony End

Steel Design for Buildings

PART IV. DESIGN OF COLUMN BASES AND FOOTINGS

By CHARLES L. SHEDD, C.E.

IN the June number of THE FORUM we took up the general consideration of the design of column bases. Figs. 17 and 18 showed two types of bases for a plate and angle column carrying loads of about 500,000 pounds.

Let us now consider the actual design of a concrete example. Let us take a load of 668,000 pounds with a column unsupported for a length of 17′ 6″. Using the column formula of 16,000—70 l/r we find that we can use a column made up thus: four 6″ x 4″ x ¾″ Ls, one 12″ x ¾″ web plate and two 14″ x ¾″ cover plates. This column has a radius of gyration of 3.25 about its weaker axis, which gives an l/r of 64.3 which in turn, with the formula just expressed, gives an allowable stress of 11,500 pounds per square inch which is about equal to the actual stress on this column with the load used. If this column base is to bear on concrete and we use an allowable bearing of 700 pounds per square inch, we get a required area of 955 square inches which requires a base at least 31″ square. If we use a steel base, as shown in Fig. 17, let us use a base plate 32″ x 32″ to make even figures. If we allow the plate itself to transfer the load a short distance out from the face of the column we can take the part which must be taken by the stiffeners as 7/32 of 668,000 or 146,000 pounds. If we use ¾″ rivets, worth 4420 pounds each in single shear, we would require 33 rivets. As we are to use four rows of rivets we will use 36 rivets, or 9 in each row as shown in Fig. 1. As these stiffeners are short we can use 16,000 pounds per square inch on them in compression which will allow us to use 6″ x 6″ x ½″ Ls. We can use the same size for the long base angles and ½″ for the thickness of the gusset. The base plate should be ¾″ thick and the short base angles could be 4″ x 4″ x ⅜″ Ls. In the small bases

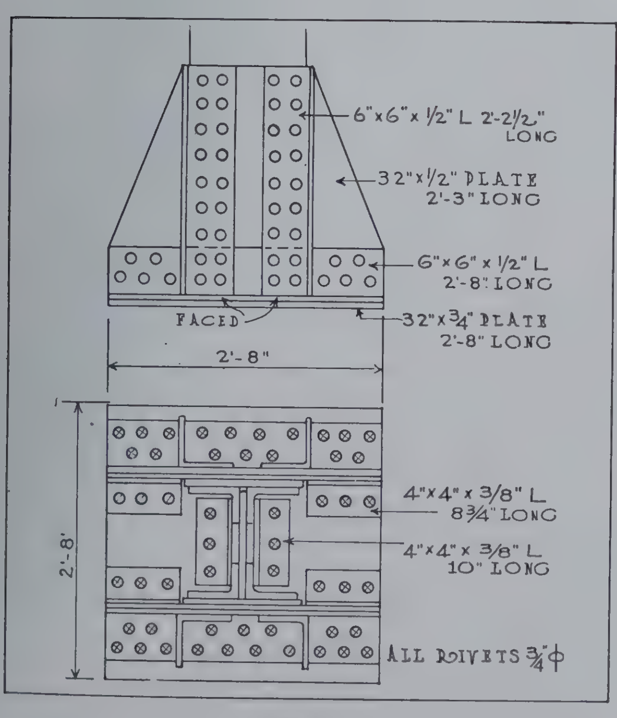


Fig. 1

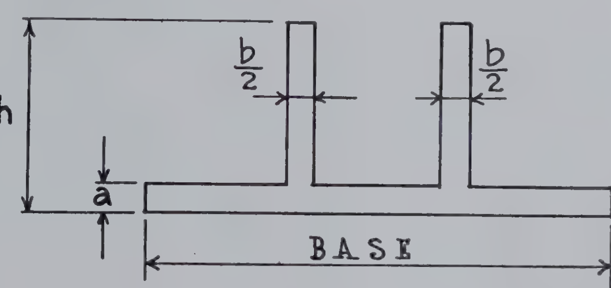


Fig. 2

shown in Figs. 14, 15 and 16 in the June FORUM the same principles apply, but probably the only thing that would be necessary to figure would be the area of the base. The number of rivets required in Fig. 16 might be a limiting factor.

If we use a cast iron base as indicated in Fig. 18 in the June number, we have a section through its center consisting of the base with two or three uprights (Fig. 2). The small projections at the top may be neglected. It is this section which resists the bending on the base. With a plate and angle column the maximum bending is at right angles to the web of the column as the distance of the center of gravity of half the column from the center of the base is less than in the other direction. To facilitate the designing of these cast iron columns a table has been prepared of the sectional moduli of various sections. Various widths of base have been used, 20″, 24″, 28″, 30″ and 36″, with various heights for each size of base; "a" is the thickness of the base and "b" is the combined thickness of the ribs. The

20″ BASES

10″ High

a	b=2″	2½″	3″	3½″
1″	126	134	140	146
1¼	139	147	155	161
1½	148	157	166	171
1¾	155	165	173	182

12″ High

a	b=2″	2½″	3″	3½″
1″	165	175	185	194
1¼	184	196	205	214
1½	200	211	222	232
1¾	212	224	236	246

14″ High

a	b=2″	2½″	3″	3½″
1″	206	221	234	247
1¼	233	246	260	272
1½	254	269	282	295
1¾	272	288	302	315

15″ High

a	b=2″	2½″	3″	3½″
1″	229	245	259	275
1¼	258	274	288	303
1½	282	299	314	328
1¾	303	320	336	351

24″ BASES

10″ High

a	b=2″	2½″	3″	3½″
1″	144	151	159	165
1¼	159	168	176	183
1½	168	180	188	196
1¾	175	186	197	206

12″ High

a	b=2″	2½″	3″	3½″
1″	190	200	210	220
1¼	212	223	234	244
1½	229	241	254	264
1¾	241	257	269	282

14″ High

a	b=2″	2½″	3″	3½″
1″	237	251	265	279
1¼	266	283	296	309
1½	291	308	323	336
1¾	312	329	343	360

15″ High

a	b=2″	2½″	3″	3½″
1″	261	278	294	309
1¼	295	312	328	343
1½	324	342	358	374
1¾	348	367	385	401

28″ BASES

12″ High

a	b=2″	2½″	3″	3½″	4″
1″	212	224	235	245	254
1¼	238	251	262	273	283
1½	256	272	285	295	306
1¾	271	287	302	314	325

14″ High

a	b=2″	2½″	3″	3½″	4″
1″	265	281	294	309	322
1¼	303	317	332	345	359
1½	327	346	362	376	390
1¾	349	370	388	402	415

15″ High

a	b=2″	2½″	3″	3½″	4″
1″	293	311	327	342	358
1¼	333	351	367	383	398
1½	364	384	402	418	433
1¾	390	414	432	449	466

18″ High

a	b=2″	2½″	3″	3½″	4″
1″	380	404	427	451	473
1¼	431	457	481	503	526
1½	478	505	528	552	575
1¾	518	547	572	596	618

30″ BASES

12″ High

a	b=2″	2½″	3″	3½″	4″
1″	224	236	247	258	267
1¼	251	264	276	287	297
1½	269	286	299	311	323
1¾	283	301	317	330	344
2	290	313	330	344	358

14″ High

a	b=2″	2½″	3″	3½″	4″
1″	280	296	311	324	337
1¼	316	334	349	363	377
1½	346	364	380	396	411
1¾	367	390	407	424	439
2	383	408	429	447	461

15″ High

a	b=2″	2½″	3″	3½″	4″
1″	309	326	344	360	374
1¼	350	370	387	404	418
1½	384	404	423	440	456
1¾	410	433	457	472	489
2	431	458	479	500	517

18″ High

a	b=2″	2½″	3″	3½″	4″
1″	399	424	447	476	493
1¼	456	482	505	528	549
1½	505	532	555	579	602
1¾	546	576	602	626	649
2	578	612	640	666	689

36″ BASES

12″ High

a	b=2½″	3″	3½″	4″	4½″	5″
1¼″	304	318	331	342	352	361
1½	327	343	357	369	380	390
1¾	344	362	378	392	404	415
2	355	375	393	409	422	434
2¼	359	383	404	421	435	448
2½	361	387	408	427	444	461

14″ High

a	b=2½″	3″	3½″	4″	4½″	5″
1¼″	383	400	416	431	445	458
1½	417	437	455	470	484	499
1¾	446	467	486	503	517	533
2	465	490	514	530	546	561
2¼	477	506	530	551	569	584
2½	488	516	544	566	585	604

15″ High

a	b=2½″	3″	3½″	4″	4½″	5″
1¼″	425	442	459	476	491	507
1½	466	486	505	522	539	553
1¾	498	521	541	561	576	594
2	523	550	573	591	611	630
2¼	542	571	596	619	639	656
2½	553	585	614	638	660	676

18″ High

a	b=2½″	3″	3½″	4″	4½″	5″
1¼″	553	578	602	626	647	669
1½	612	640	664	688	711	735
1¾	661	691	719	745	767	787
2	703	735	765	790	814	840
2¼	735	774	804	832	859	882
2½	762	801	836	868	895	921

SECTIONAL MODULI OF CAST IRON BASES

figure in the body of the table is the sectional modulus.

As 31″ is required we will use the next larger in the tables, that is 36″. The moment will be equal to half the load on the column multiplied by a quarter the width of the base, less the distance from the center of the base to the center of gravity of half the column, in this case 334,000 (9–2.38), and this divided by the allowable tension on cast iron (3,500 is used here) gives the required sectional modulus. Looking up this quantity (630) in the portion of the table for 36″ bases we find various sections which we may pick from:

h	a	b	h	a	b
15″	2½″	4″	18″	1¾″	2½″
15″	2¼″	4½″	18″	1½″	3″
15″	2″	5″	18″	1¼″	4½″

It is best to have the thickness of the cast iron directly below the column at least as thick as the column metal itself. This might necessitate thicker metal in some cases than would be required for the sectional modulus. The ideal base, of course, is the one which will fulfill all the conditions we have noted and be of least weight. One of the most important conditions to remember, as noted in the June FORUM, is to keep the thicknesses of metal as nearly equal as possible. To do this it is usually best to choose a base where "b" is about twice "a." The local bending between ribs is also an important consideration. In a column as large as the one we are designing for, this thickness of the base should not be too small and it would be safer to choose the first than the second section of these we have found possible in the table. This means that we can use a base 15″ high with the base 2½″ thick (Fig. 3). The two ribs under the flanges of the column should equal "b" or 4″, so we can make them 2″ each as the steel above is only 1½″ thick. The steel in the web of the column is 2¼″ thick, therefore we should make the middle web of the base 2¼″ thick. The two side ribs parallel to it could be made 1″ each, using the minimum thickness as the two side ribs plus the middle rib would then equal 4¼″, which is more than the required value of "b." The corner

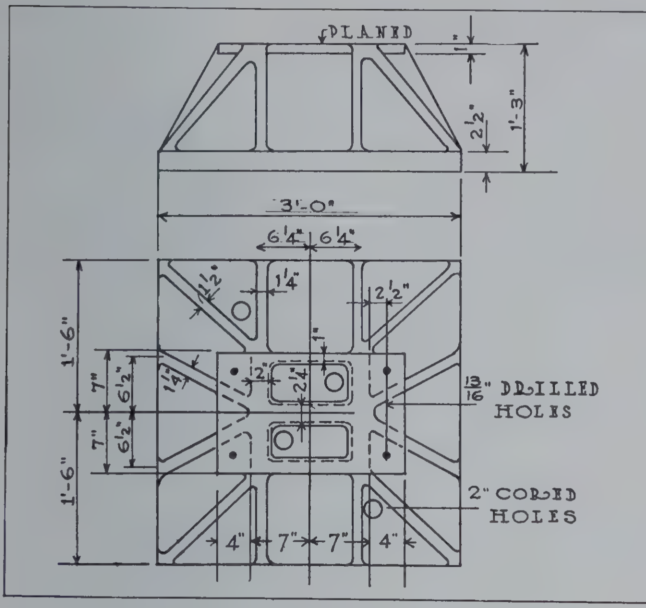


Fig. 3

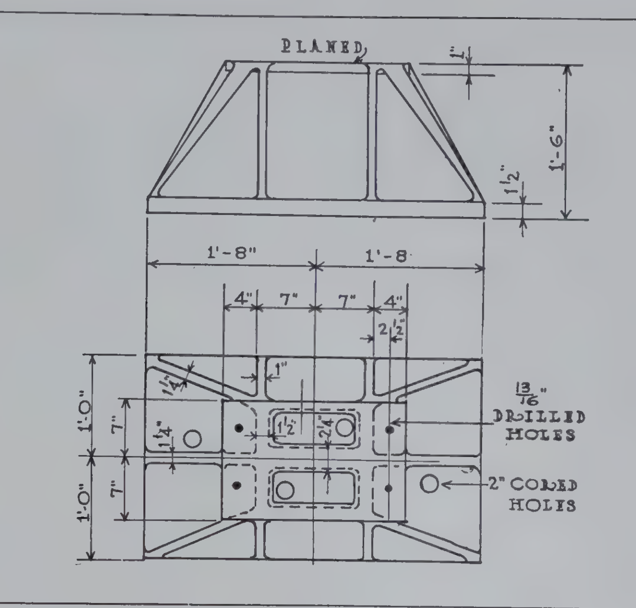


Fig. 4

ribs could be made 1½″ and the other outside ribs 1¼″. The top plate should be the minimum thickness, that is 1″, and should project 4″ beyond the ribs under the column flanges to allow the bolts connecting the base to the column to be easily placed in position. In larger bases, where cast steel is employed, 16,000 could be used as the allowable fiber stress in place of 3,500. Other sizes of bases can be readily used besides those given in the table by proportion, as will be shown.

If we multiply both the width of base and "b" by any factor we are also multiplying the sectional modulus by that same factor. If we multiply the height and "a" by a factor we are multiplying the sectional modulus by the square of that factor. For example, referring to the table we may find these values:

Base	h	a	b	I/y
20″	12″	1½″	2″	200
30″	12″	1½″	3″	299

and the values:

Base	h	a	b	I/y
36″	12″	1½″	2½″	327
36″	18″	2¼″	2½″	735

where it will be noted that 327 x 1.5 x 1.5 = 735.

From this relation we may use the tables for an endless number of base designs. For example, we may design the base which we have already designed for one just 32″ square, by using the 36″ table. 36/32 = 1.12. The required sectional modulus would be $\frac{334{,}000(8-2.38)}{3{,}500} = 540$. 540 x 1.12 = 600. Looking this up in the 36″ table we find:

h = 18″ a = 1¼″ b = 3½″ I/y = 602.

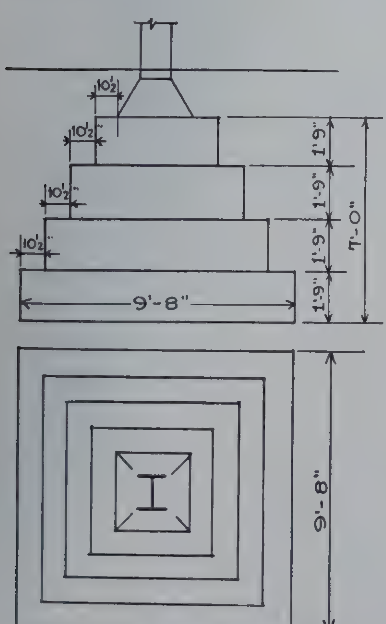


Fig. 5

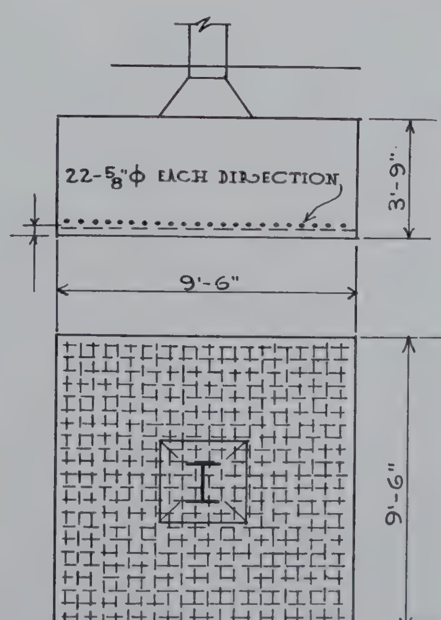


Fig. 6

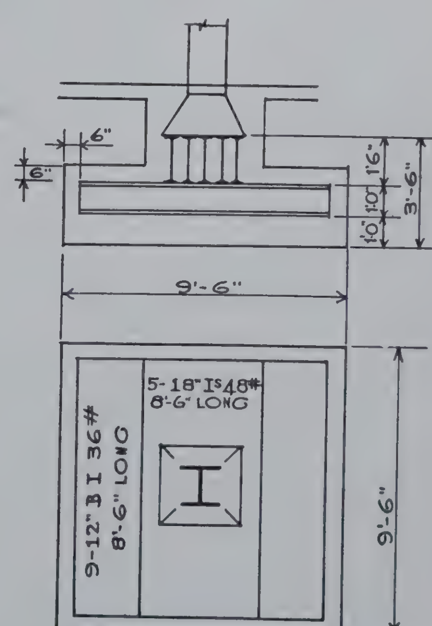


Fig. 7

3½″ divided by 1.12 would equal 3.13 and we could use a base

Base = 32″ h = 18″ a = 1¼″ b = 3¼″.

Places are at times encountered in a building where it is desirable to use an oblong base. These tables may still be used with the aid of these rules.

The column for which we have already designed three bases may be used again for an oblong base. The area required was 955 square inches. If we had to have this base 24″ wide it would have to be 40″ long (Fig. 4). If the web of the column is parallel to the long side of the base an economical base may be designed. The distance from the center of the column to the center of gravity of half of the column, measured parallel to the web, is 5.36. The moment in this direction would then be 334,000(10−5.36) and the required sectional modulus would be 443. For this we find for a 24″ base h = 18″ a = 1½″ b = 2½″. The moment in the opposite direction would be 334,000(6−2.38) and the required sectional modulus 345. For a 40″ base with h = 18″ and a = 1½″ the value of "b" could be a minimum or 2″.

Under the column base the footing may be made of concrete or a combination of concrete and steel. Such a combination may be reinforced concrete or grillage beams encased in concrete, or a combination of grillage with concrete below it, either plain or reinforced.

If the footing is plain concrete (Fig. 5) not reinforced the footing may be assumed to weigh about 10% of the column load, or in this case 66,800 pounds, which would make a total load on the soil equal to 734,800 pounds. If we had soil capable of carrying 8,000 pounds per square foot we should require a footing of 92 square feet or 9′ 8″ square. In plain concrete, steps are usually made about 2′ high and 1′ wide. With a 32″ column base this would require a footing 7′ 0″ deep.

If the column footing were made of reinforced concrete (Fig. 6) the footing could be most easily designed from tables found in Hool and Whitney's "Concrete Designers' Manual." Here we find that the reinforced footing would be 9′ 6″ square, 3′ 9″ deep with 17 square ⅝″ or 22 round ⅝″ rods in each direction.

If we used grillage (Fig. 7) we could design it readily from Table I in the July Forum. We will use a footing 9′ 6″ square which will project 3′ 5″ each side of the base. The grillage can be made of several I beams side by side under the base extending to within 6″ of the outside of the footing, with another layer of I beams under them and at right angles to them and of the same length. The bending on each layer would be 334,000 (2.92−1.33) = 530,000 foot-pounds. The shear on each layer would be $668{,}000\ \frac{3.42}{9.50} = 240{,}000$ pounds.

To design these beams it is a simple matter to make a table for the investigation of each footing. First find the actual buckling per lineal inch for various depths of beam. This will be equal to the column load divided by the width of base plus half the depth of the beams. Thus:

12″ Beams	668,000/38	= 17,600
15″	39.5	= 16,900
18″	41	= 16,300
20″	42	= 15,900

We can now make a table showing the required moment, shear and buckling per beam for various numbers of beams. Thus:

No.	Mom.	Shear	Buckling 12″	15″	18″	20″
9	59,0	26,7	2,0	1,9	1,9	1,8
8	66,3	30,0	2,2	2,2	2,1	2,0
7	75,7	34,4	2,5	2,5	2,4	2,3
6	88,5	40,0	3,0	2,9	2,8	2,7
5	106,0	48,1	3,6	3,4	3,3	3,2
4	132,5	60,1	4,4	4,3	4,1	4,0
3	176,8	80,2	5,9	5,7	5,5	5,3

To find the most economical beam for each case we can use Table I in the July Forum and follow down the column of moments until we find a moment of resistance large enough, then see if the shear and buckling are all right. If they are not, follow down still farther in the table and the first one found which will satisfy all three requirements is the most economical for that number of beams. Thus if we have four beams, with a moment on each of 176,800, we find that the first one is the 20″ BI 59# and that the shear is also sufficient, but the buckling is only good for 3,700 while we require for a 20″ beam 4,000. Following on still farther, the first one reached which satisfies all conditions is the 21″ I 60½#. The flange width may be another limiting factor. There should be at least an inch between flanges to allow for proper filling with concrete. In the table given here we will show the size of beam required, the combined flange width for each group allowing 1″ between each flange, and the weight per lineal foot of each group for comparison:

No.	Section	Flange	Weight
9	12″ BI 36#	64.7	324
8	15″ I 37½#	51.0	300
7	15″ BI 38#	52.2	266
6	18″ I 48#	41.0	288
5	18″ I 48#	34.0	240
4	21″ I 60½#	29.0	242
3	20″ I 80#	23.0	240

Evidently the six-beam grillage would not be best for any case. The four-beam would likewise never be chosen. With a 32″ column base we could use either the five- or the three-beam for the top course. The weight would be the same and the flange width would be satisfactory, as in the five-beam design the flanges would only project an inch on each side of the base, leaving the webs well under the base. As these beams are 2″ less in depth than the three-beam we will use these to save that much excavation. In the bottom course we have 6′ 9″ less 1 foot of concrete, as the allowable flange width which would be 102″. Thus any of the designs could be used here. If the beams are a foot apart the stress can be distributed satisfactorily to the concrete below. We will therefore use nine beams for the lower course. This makes the footing 3′ 6″ deep which is 3″ less than for reinforced concrete.

Testing Materials

By HERBERT L. SHERMAN, B.S., of Skinner, Sherman & Esselen, Inc., Chemists and Engineers

IT is in order to assure the use of only entirely satisfactory materials that architects and engineers so universally call for tests or inspections.

About 25 or 30 years ago the larger consumers of cement began to install testing laboratories. Those were hard days for the cement manufacturer. Not only was his product less uniform than today and the justified number of rejections greater, but he had to contend with tests made by entirely unqualified testers who knew little if anything about the action or use of cement. It was always "up to the manufacturer" to prove himself innocent, and often it meant great expenditure of time and money.

It was also customary, not so many years ago, for each engineer or architect to write his own specifications and they were, indeed, a varied lot. If the manufacturer did not supply a product which would pass each requirement of each consumer, he was likely to be ordered to remove the cement from the site. It was an impossible situation. However, the great bulk of cement used was not tested and it speaks well for the industry in its infancy that so many fine pieces of work are standing in such excellent condition.

Until a few years ago, testing was nearly always done on samples taken from the job. This meant that considerable storage space was necessary for a large piece of work as, even from the start, it has been unsafe to pass any conclusive opinion until seven-day tests are completed. In recent years, however, it has become more customary to test the cement at the point of shipment, a representative of the testing laboratory taking samples from each car as it is loaded.

The American Society for Testing Materials has done more than any other body to advance the cause of cement testing and, in fact, the testing and inspection of materials in general. Large committees representing both consumers and manufacturers have worked for years on the preparation of standardized specifications which shall be fair to all, and their work has been wonderful.

All the architect or engineer has to do today is to include a sentence in his specifications under "Cement" that "All Portland cement used shall meet the requirements of the American Society for Testing Materials." Every manufacturer agrees, without the necessity of a special clause, to produce a material which is satisfactory under these specifications. The requirements are thus given:

Standard Specifications and Tests for Portland Cement

Serial Designation: C9—21

Adopted, 1904: Revised 1908, 1909, 1916, 1920 (Effective Jan. 1, 1921)

These specifications were approved January 15, 1921, as "Tentative American Standard" by the American Engineering Standards Committee.

Specifications

1. Portland cement is the product obtained by finely pulverizing clinker produced by calcining to incipient fusion an intimate and properly proportioned mixture of argillaceous and calcareous materials, with no additions subsequent to calcination excepting water and calcined or uncalcined gypsum.

I. Chemical Properties

2. The following limits shall not be exceeded:

Loss on ignition, per cent	4.00
Insoluble residue, per cent	0.85
Sulphuric anhydride (SO_3) per cent	2.00
Magnesia (MgO) per cent	5.00

II. Physical Properties

3. The specific gravity of cement shall be not less than 3.10 (3.07 for white Portland cement). Should the test of cement as received fall below this requirement, a second test may be made upon an ignited sample. The specific gravity test will not be made unless specifically ordered.

4. For fineness, the residue on a standard No. 200 sieve shall not exceed 22 per cent by weight.

5. A pat of neat cement shall remain firm and hard, and show no signs of distortion, cracking, checking or disintegration in the steam test for soundness.

6. The cement shall not develop initial set in less than 45 minutes when the Vicat needle is used, or 60 minutes when the Gillmore needle is used. Final set shall be attained within 10 hours.

7. The average tensile strength in pounds per square inch of not less than three standard mortar briquettes (see Section 50) composed of one part cement and three parts standard sand, by weight, shall be equal to or higher than the following:

Age of Test, days	Storage of Briquettes	Tensile Strength lbs. per sq. ft.
7	1 day in moist air, 6 days in water	200
28	1 day in moist air, 27 days in water	300

8. The average tensile strength of standard mortar at 28 days shall be higher than the strength at 7 days.

III. Packages, Marking and Storage

9. The cement shall be delivered in suitable bags or barrels with the brand and name of the manufacturer plainly marked thereon, unless shipped in bulk. A bag shall contain 94 lbs. net. A barrel shall contain 376 lbs. net.

10. The cement shall be stored in such a manner as to permit easy access for proper inspection and identification of each shipment, and in a suitable weather-tight building which will protect the cement from dampness.

IV. Inspection

11. Every facility shall be provided the purchaser for careful sampling and inspection at either the mill or at the site of the work, as may be specified by the purchaser. At least 10 days from the time of sampling shall be allowed for the completion of the 7-day test and at least 31 days shall be allowed for the completion of the 28-day test. The cement shall be tested in accordance with the methods hereinafter prescribed. The 28-day test shall be waived only when specifically so ordered.

V. Rejection

12. The cement may be rejected if it fails to meet any of the requirements of these specifications.

13. Cement shall not be rejected on account of failure to meet the fineness requirement if, upon retest after drying at 100 C. for one hour, it meets this requirement.

14. Cement failing to meet the test for soundness in steam may be accepted if it passes a retest, using a new sample at any time within 28 days thereafter.

15. Packages varying more than 5 per cent from the specified weight may be rejected; and if the average weight of packages in any shipment, as shown by weighing 50 packages taken at random, is less than that specified, the entire shipment may be rejected.

Frequently the chemical properties are not determined on each carload, it being generally thought sufficient to make an occasional analysis for sulphuric anhydride and magnesia or to omit these tests entirely. If the physical tests are all good there is no need for adding to the expense for testing, unless the use of the cement is such that limits for certain elements are advisable.

The story to be told by each test is, in most cases, obvious. They show the rate of hardening, the strength and rate of improvement with age, the sand-carrying capacity and the general condition of concrete or mortar which may be expected with the passage of time. It is safe to say that any cement which passes these requirements is good.

While the almost universal use of cement testing is comparatively recent, the testing of concrete aggregates is far more recent. In fact, it is only within the past two or three years that these materials have been investigated to any appreciable extent. Sand is undoubtedly the worst offender among the constituents of concrete, but it still pretty generally devolves upon the cement company to prove this fact. Concrete seldom develops any defects without the contractor's making a demand on the cement manufacturer to pay for the damage. In the writer's experience, it is found that there are about ten cases of poor sand to every one of poor cement.

The most common cause for poor sand is the presence of loam. Cement will not carry loam, and even increasing the richness of the mixture will not make good concrete. It simply will not harden properly and sand of this kind should always be rejected. Unfortunately, the quality of sand cannot be told, excepting in rare instances, by its appearance, but there are tests which will tell absolutely.

It is customary to conduct tests for tensile strength in comparison with standard testing sand, using a cement of known good quality; for fineness or grading by means of sieves of definite sizes, and for the presence of organic matter. Just now there is considerable discussion regarding the substitution of a compression strength test instead of the tensile test usually used on the ground that concrete is always used under compression. We shall not attempt to participate in the discussion in this article.

As already said, loam is the most common cause for poor sands but run-of-bank gravel is a close second. Concrete must, of course, be fairly accurately proportioned to give the desired results. Gravel, as it occurs in most banks, contains considerably more sand than true gravel and as a result the concrete will contain an undue percentage of sand and a small amount of coarse aggregate. Bank gravel should always be screened before using, and the resulting sand and gravel, if of good quality, properly proportioned before mixing again.

On much small work, these conditions are not attended to. Poor concrete results, and the testing laboratory may be called on for a post-mortem instead of for a preliminary diagnosis. It becomes necessary in such cases to dissolve the cement out of the mixture as used and, by screening the separated aggregate, determine the amount of sand and stone. It is impossible to tell, with any accuracy, the quality of the original materials. Nothing can be said of the cement. This is destroyed by the analysis. Also any organic matter originally present in the sand has been consumed.

Stone or coarse aggregate can generally be passed upon without test. It is of value to ascertain the proportions of particles of various sizes or the grading, and this can be done simply by means of a few sieves, but the nature of the particles themselves can be as well studied with a hammer as by means of an extensive series of laboratory tests.

The two most important materials of construction for large buildings are, of course, concrete and steel. The use of the testing laboratory with relation to the former has been told. In the case of steel, the architect usually calls for a standard structural grade, here again using the requirements of the American Society for Testing Materials. Inspection is then entrusted to some reputable testing laboratory, which sends its representative to the steel mill, where the rolling is carefully observed; tests of specimens from each melt are witnessed to determine the tensile strength, elongation, bending, etc., and weights and dimensions are checked.

Shop inspection includes no tests, but in the realm of steel there is no service of more value. The fabricating or bridge shop receives its steel from the rolling mill and builds girders, beams, columns, etc., all ready to be put together on the building site. The inspector makes regular visits to the shop, or works continually in the larger shops. He has copies of all detail prints for each of his jobs and he goes over each member with the utmost care, checking dimensions, location and punching of holes, testing rivets, and, in short, seeing that each and every piece is exactly as ordered. As a result, a well inspected steel job will fit together in the building without need of troublesome and costly alterations.

There are of course many ways other than in testing cement and inspecting steel in which a testing laboratory works with the architect and engineer. However, these two services are the most frequently used and most regularly needed. Brick, lime, paint, putty, plaster, etc., are often examined, but not to the extent of these already mentioned, and it would needlessly prolong this paper to discuss them.

It would hardly do to close an article on this subject without mentioning briefly the inspection of treated lumber. This is generally impregnated with so-called creosote oil, but treatments with such substances as zinc chloride and sodium fluoride are on the increase for building construction. Inspection of this material comprises an examination of the untreated wood, analysis of the impregnating oil and inspection of the creosoting process, including the steaming vacuum and pressure treatments, so that the resulting lumber shall contain the right amount of the proper kind of preservative. On the quality of treatment the life of lumber depends.

The equipment required for the larger testing laboratories or inspection bureaus is extensive and many skilled men must be kept upon their pay rolls. Furthermore, the recompense for this class of work has never been commensurate with the value of the work performed. Clients' battles must be fought, as protests against rejection are not infrequent and the laboratory must be in a position to prove its contentions.

Architects and engineers are continually increasing their demands for work of this character and are more and more conscious of the value of this extra care in seeing that the owner gets what he pays for.

The Essex County Tuberculosis Hospital

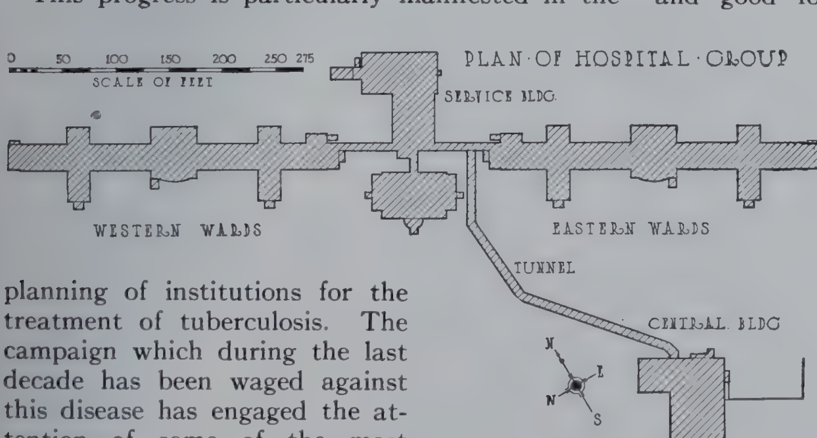
MIDDLETON, MASSACHUSETTS

JOHN H. BICKFORD COMPANY, BOSTON, ARCHITECTS *and* ENGINEERS

By REUBEN H. DOCKHAM

PROBABLY only those who specialize in the planning or equipment of hospitals, or who are connected in some way with their administration, are familiar with the rapid development which is taking place in this department of architectural work. The institution which is regarded today as the last word in planning is before long out-distanced by another, wherein are embodied still more advanced ideas of planning or details of equipment.

This progress is particularly manifested in the



planning of institutions for the treatment of tuberculosis. The campaign which during the last decade has been waged against this disease has engaged the attention of some of the most eminent members of the medical profession, and assisting them have been schools of research and carefully trained specialists in many forms of allied effort ; the entire movement has been supported not only by public funds, but also by those of powerful foundations, and the whole has resulted in a great outpouring of popular interest and enthusiasm. As might be expected, therefore, a modern hospital when planned upon a considerable scale for the treatment of tuberculosis in its varied stages is apt to represent the highest type of excellence which this combined effort has put forth.

It is not long ago that buildings for the treatment of tubercular sufferers were crudely built and equipped, as it was deemed necessary only that the patient be supplied with open air accommodations and good food. These buildings were termed "shacks" because of their crudeness. All this is changed, however, and a modern tuberculosis hospital is not merely a "patients' boarding house," but a highly developed and fully equipped institution for the care and treatment of tubercular patients, and also for the carrying on of research work in this particular field.

The Essex County Tuberculosis Hospital, popularly known as Essex Sanatorium, located in the Town of Middleton, about 25 miles north of Boston, is the most recent of its type and is considered the most complete of any yet built. Situated on a hillside and overlooking a wide expanse of open country, the hospital immediately impresses the visitor with its air of entire completeness, and as being an institution in the planning of which good taste

in architecture has been joined to a high degree of engineering skill.

Some distance back from the public highway, and against a background afforded by a wooded hilltop, stretches the long and finely proportioned group of buildings, consisting of a central pavilion flanked upon each side by a symmetrical wing, joined to the pavilion by a one-story glazed arcade. The pavilion has three stories and a low basement, while the wings have each two stories and a low basement. Great care has been taken to give the buildings a suitable architectural expression, rich in simplicity and proportions.

The buildings face about ten degrees west of south. The front exterior walls are treated with gray stucco of moderate roughness of texture, relieved with a trim of ivory white artificial stone. The exterior rear walls are veneered with a very light shade of vitrified brick. The backing of all exterior walls is interlocking hollow tile.

The Main Pavilion

As the visitor enters the Administration Building through the main doorway under a semi-circular portico he finds himself in a broad hall which is a reception room for visitors and patients. Here are the general office and Superintendent's private office adjoining, both on the left of the spacious reception hall, while on the right are the medical offices consisting of the Superintendent of Nurses' office, examination room and throat room, all of which are equipped with the latest fixtures and devices for determining the various phases of tuberculosis.

The second and third stories of the Administration Building contain the sleeping rooms for certain members of the staff and the nurses, complete with sitting room and baths, while in the basement are located the X-ray room with as complete an equipment as money will purchase, a fully equipped pharmacy and a laboratory supplied with the most modern apparatus and devices for both pathological and research work. Here also are several small offices, and the general linen room for the whole institution, besides record vaults, toilet rooms for both men and women and a large general storeroom.

As one passes from the reception hall in the first story of this building, one may continue through the glazed corridor to the patients' dining hall, a room spacious in size, architecturally attractive and full of light and cheerfulness, the room being supplied with light and air by four very large windows on each of two sides and having semi-circular transoms that may be opened inwardly. These windows open toward both the east and west, therefore this room is supplied with sunshine both forenoon and afternoon.

Immediately in the rear of this dining hall is the service building, in which on the first floor are the nurses' dining room, servants' dining room, the serving room for the main dining hall, the main kitchen and the steward's room.

The serving room is placed so as to give rapid and convenient service to all three dining rooms and is equipped with steam tables, hot closets, a specially designed milk cabinet cooled from the refrigerating system, cup warmer, bread and pastry cabinet, ice cream cabinet, coffee urns and the customary small utensils for quick and economical service. Adjoining the serving room is the main kitchen, to one side of which and opening into the serving room is the dish washing room. The kitchen, including the dish washing room, is a marvel of compactness and convenience, and is equipped with all modern devices and machines to save labor and allow of rapid and skillful work. Especially interesting is the arrangement of the large French range and the steam cooking fixtures, all of which are grouped in the middle of the room with ample space all around, while an eight-door refrigerator is close to the chef's cooking table.

The dish washing room was especially designed for cleansing and sterilizing the dishes used by the patients, which are kept entirely separate from those used by the staff, nurses and servants. The machine in this room will wash, sterilize and dry

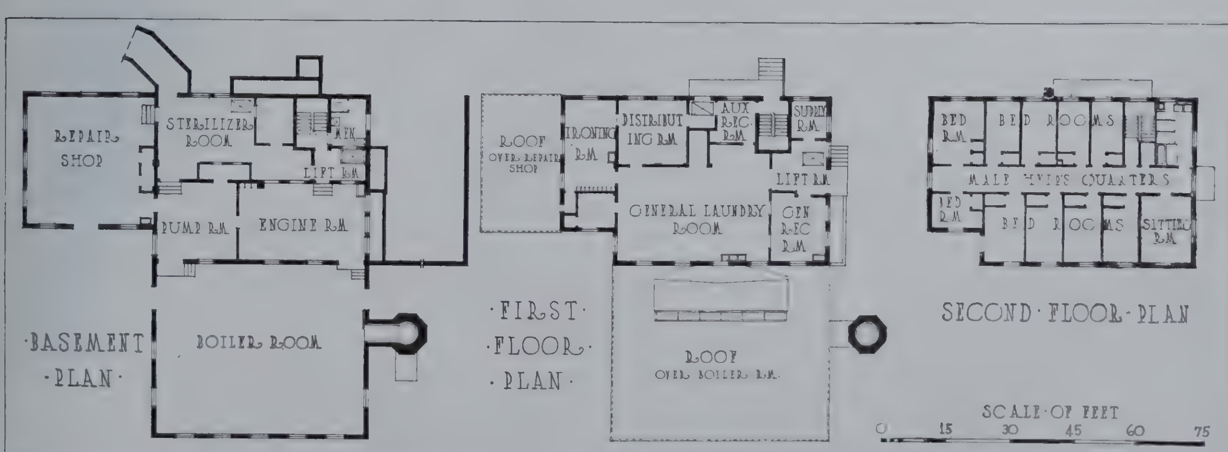
Patients' Dining Room in Rear of Administration Building

2000 pieces per hour if run to its full capacity, and all with the help of two persons. In the basement of this building is located the bakery, the equipment of which in point of convenience and completeness rivals that of the kitchen above. Here also is the cold storage plant, divided into five separate compartments to avoid a transference of natural odors, and which is of a capacity that, when filled, would defy the effects of possible strikes, embargoes on transportation lines, or the designs of profiteers. One of the most unique and important adjuncts to the cold storage plant is the garbage cooler, so arranged and connected to the ammonia circulating system that all garbage from the hospital buildings is kept at a temperature that will not breed or attract flies, nor permit ferment prior to its being taken away. Other adjuncts are the ice making tank and storage space for ice. Near this section of the basement are two storage tanks of 5000-gallon capacity for water. These tanks are supplied with necessary additional pressure to supplement that of the public water service. Town water pressure at this basement level is indicated at 31 pounds per square inch, which is too low for good service upon the upper floors of the hospital buildings. This pressure is augmented in the storage tanks by means of electrically driven pumps, automatically controlled, to give a suitable working pressure. An ingenious arrangement of valves provides for the instant segregation of the hospital water system from the town supply, always with a reserve of 5000 gallons. All drinking water, and that used for cooking purposes, both hot and cold, is thoroughly filtered.

A Typical Ward Showing Lighting, Heating and Ventilating Arrangements on Wall toward Corridor

The Hospital Wards

The two long two-story wings which extend to the right and left of the central pavilion or Administration Group just described, with which they are connected by glazed arcades, contain the quarters occupied by the patients themselves. Each of these four floors is organized and administered as a separate hospital; each has its own staff of nurses and attendants, and the result is practically four wholly separate institutions, each of which is devoted to the treatment of tuberculosis in some one of its various stages. It would be difficult to imagine anything more complete than the arrangement of these subsidiary hospitals, for each is planned with the idea of making it as comfortable as may be for the patients, and also with a view to making possible the most effectual work on the part of nurses and attendants. Through each of these minor hospitals there extends on the north side a long service corridor from which one may enter the wards and the various rooms and departments which pertain to their operation. Each of the minor hospitals has three so-called "terminal rooms," and each has its own isolation room, cut off by air locks, for contagious diseases. These rooms are so arranged that they may be entirely isolated from the rest of the hospital, and each has



Floor Plans of Service Building
Essex County Tuberculosis Hospital, Middleton, Mass.

its screened sleeping porch and communication by stairway with out of doors. Instead of having one general wash room and dressing room for patients in each of these separate hospitals, each of the larger wards has its separate wash room opening directly from it and part of each wash room is divided into tiny dressing rooms, each of which is shared by two patients, each patient having his own steel locker in which his small belongings are kept.

In hospitals for the treatment of tuberculosis arrangements are made for keeping the patients in the open air as much of the time as is possible. In this instance the wards are intended to be open to the air, in all but the most extreme winter weather, by means of casement windows, and in order that the air within the wards may be kept in constant circulation in cold weather, heating radiators are placed along the walls which divide the corridors from the wards, and *opposite* the windows in order that the warm air, rising from near the floor, may assist in keeping the air at the patients' heads in constant motion. The lateral porches, with which this hospital is provided, are a very successful solution of a problem which heretofore has meant the darkening of the wards and exclusion of the sun; here they are placed so that their *smaller* dimensions join the building and at points which are not occupied by wards, so that neither light nor air is kept from the patients.

In planning this sanatorium three other important adjuncts have been provided. In the basement of the East Ward building is an assembly room supplied with complete moving picture apparatus. This room will seat nearly 100 persons and is marvelously light and airy and attractive for a basement room. In the West Ward building, in a corresponding position to that of the assembly room, is a chapel with a seating capacity of 75 persons which is equally attractive in point of light and air as the former room. Both of these rooms are artificially ventilated and each is supplied with a small emergency room and toilet facilities for men and women.

As death is always liable to be in the midst of the occupants of an institution of this kind, a mortuary room becomes necessary, and this has been supplied in the rear of the basement of the West Ward building and at a point where the transfer and attention to a deceased patient is attended with the greatest privacy. This room is complete in every detail and includes an autopsy table, a four-section cooler and surgeon's toilet facilities. This room is also artificially ventilated and heated by indirect steam.

To make the institution still more complete, each of the four hospital floors already described has an auxiliary examination room, one of which is thoroughly equipped as an operating room and one as a violet ray room. In the East Ward building is a thoroughly equipped barber shop, and in the West Ward building is a dental room with all of the latest appliances for caring for the teeth.

Central Power and Heating Plant

An institution of this size (it readily accommodates 200 patients) requires a central power and heating plant, and this has been provided in a separate building about 300 feet from the main hospital buildings and connected with them by a service tunnel or subway through which pass the steam pipes and electric cables. This tunnel simplifies the traffic to and from the main hospital buildings and makes possible the unobstructed operation of the complete institution irrespective of weather.

The engine room contains one 60-kwt. engine generator unit, installed primarily for power purposes, but it is so connected that current for lighting may be supplied from it in case of temporary failure of the Town of Danvers municipal plant from which service is available for permanent lighting of the hospital buildings. There is ample space in the engine room for another engine generator unit. In the pump room adjoining the engine room are one steam-driven and one electrically-driven vacuum pump, and one steam-driven and one electrically-driven boiler feed pump, making the possibility of a failure of the heating plant exceedingly remote. These pumps all operate automatically and are connected to a central tank which receives the drainage from the entire heating and power systems and returns it to the boilers. In this room is also located a triplex fire pump, so connected as to deliver 120 gallons of water per minute at 100 pounds pressure to a hose attached to any one of five hydrants distributed about the hospital buildings. This pump also serves as an automatic booster of the water pressure.

The boiler room contains three 66-inch horizontal tubular boilers in brick settings, and the system of piping is such that either boiler may be run at high or low pressure, or one may be run high and another low at the same time. The plant is designed to heat with the vacuum system and during the heating period the exhaust steam from the engine and pumps may be turned directly into the low pressure heating main. By this process 60 kwts. of power are obtained as a by-product at little cost for fuel.

On the first floor of this building is the hospital laundry, a veritable model of its kind. It is supplied with the most modern machinery and each piece is driven by an individual, direct-connected electric motor, and is protected by safety devices to prevent accidents to operatives. There are sterilizing washers for the patients' clothing separate from another for the clothes of the staff and employes, and these washers are so built and installed that the soiled linen is put into the machines in special receiving rooms and is taken out clean on the opposite side of the washers in the main laundry room.

There are many other novel and useful features throughout the buildings to interest those who have to do with hospitals, and much may be learned by a study of this institution, which can truthfully be said to be the "last word" in sanatoria.

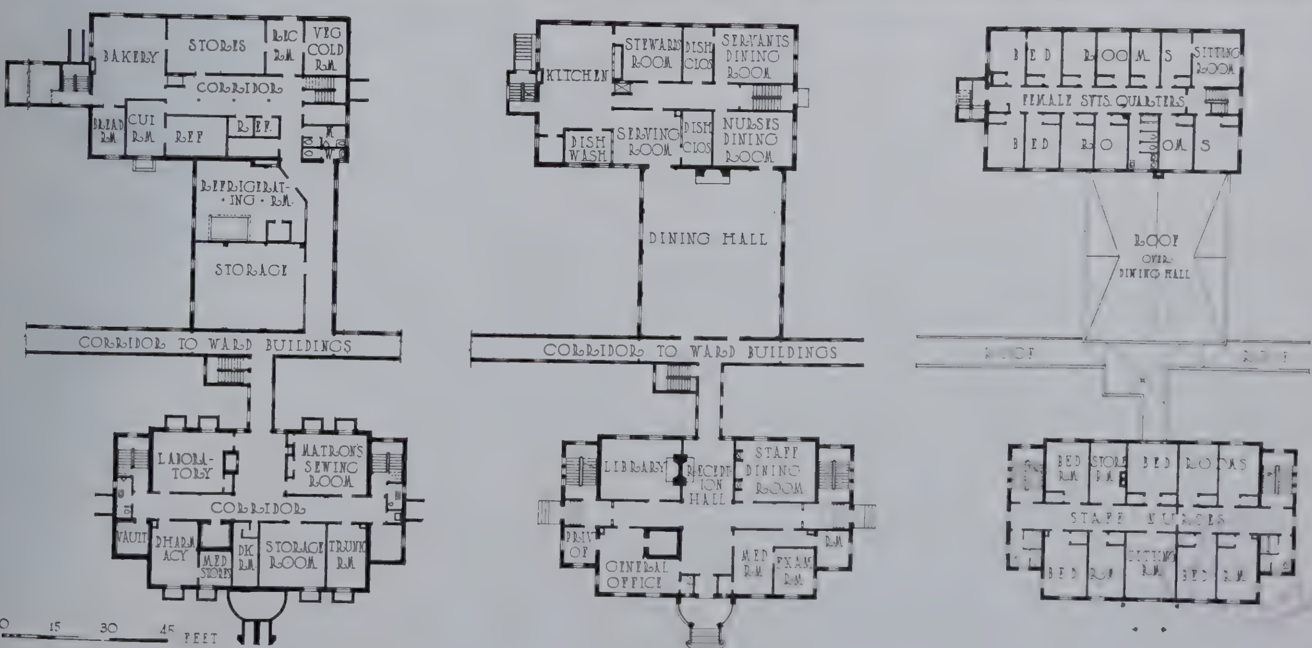
ADMINISTRATION BUILDING
ESSEX COUNTY TUBERCULOSIS HOSPITAL, MIDDLETON, MASS.
JOHN H. BICKFORD COMPANY, ARCHITECTS

VIEW OF WEST WARD WING

ESSEX COUNTY TUBERCULOSIS HOSPITAL, MIDDLETON, MASS.

JOHN H. BICKFORD COMPANY, ARCHITECTS

DETAIL OF EAST WARD WING

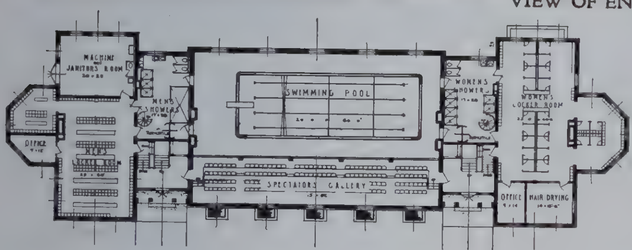


FLOOR PLANS OF ADMINISTRATION AND SERVICE BUILDINGS

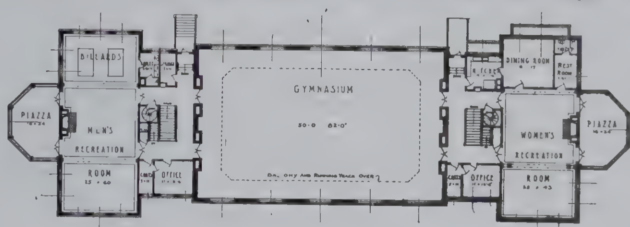
ESSEX COUNTY TUBERCULOSIS HOSPITAL, MIDDLETON, MASS.

JOHN H. BICKFORD COMPANY, ARCHITECTS

VIEW OF ENTRANCE FRONT



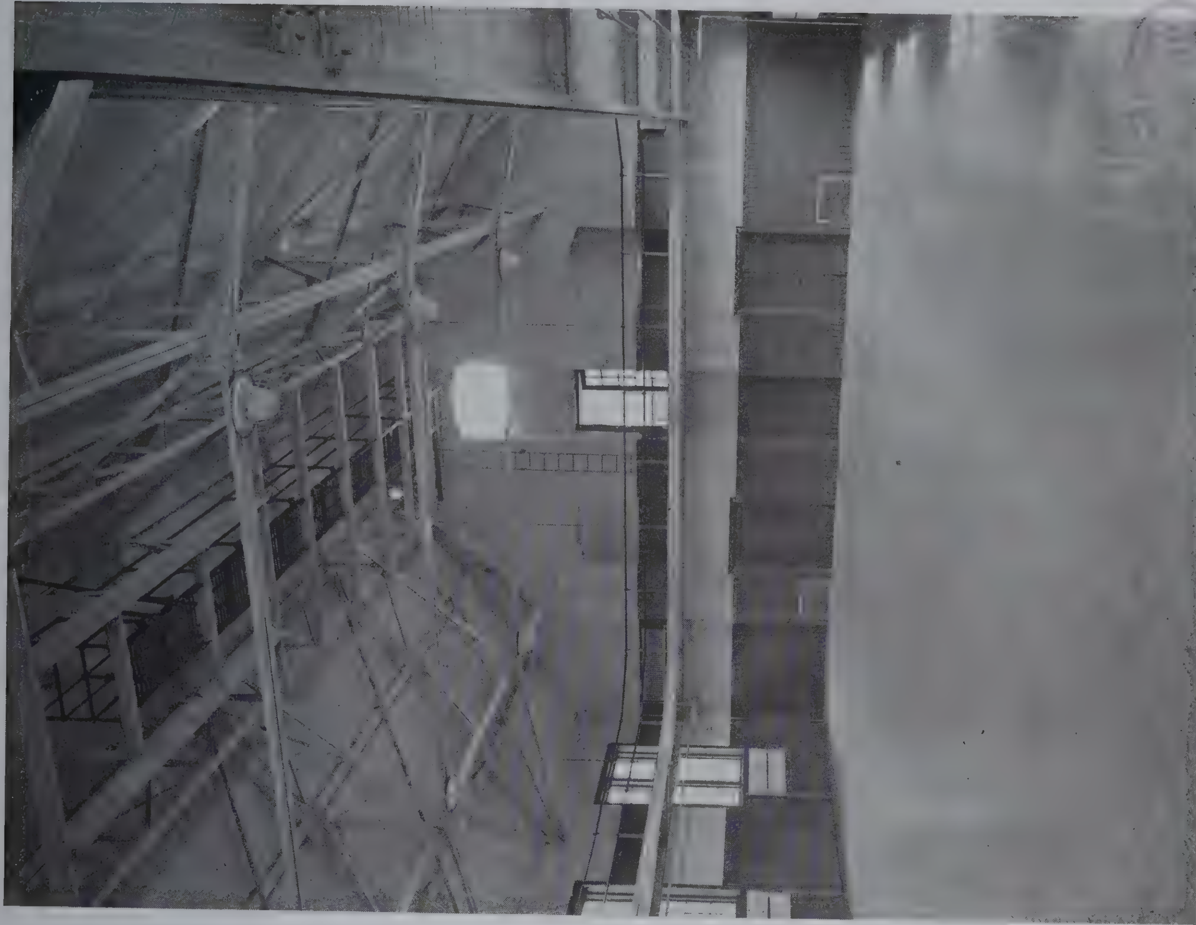
GROUND FLOOR PLAN



MAIN FLOOR PLAN

VIEW OF REAR AND END

RECREATION BUILDING, NEW HOLLAND, GA.
FOR EMPLOYES OF PACOLET MANUFACTURING COMPANY
KILHAM, HOPKINS & GREELEY, ARCHITECTS



GYMNASIUM

WOMEN'S SOCIAL ROOM

SWIMMING POOL

RECREATION BUILDING, NEW HOLLAND, GA.
FOR EMPLOYES OF PACOLET MANUFACTURING COMPANY
KILHAM, HOPKINS & GREELEY, ARCHITECTS

GENERAL VIEW OF GARDEN SIDE

HOUSE OF DARRAGH PARK, ESQ., ROSLYN, LONG ISLAND, N. Y.

PEABODY, WILSON & BROWN, ARCHITECTS

DETAIL OF LIVING ROOM WING

VIEW OF ENTRANCE FRONT

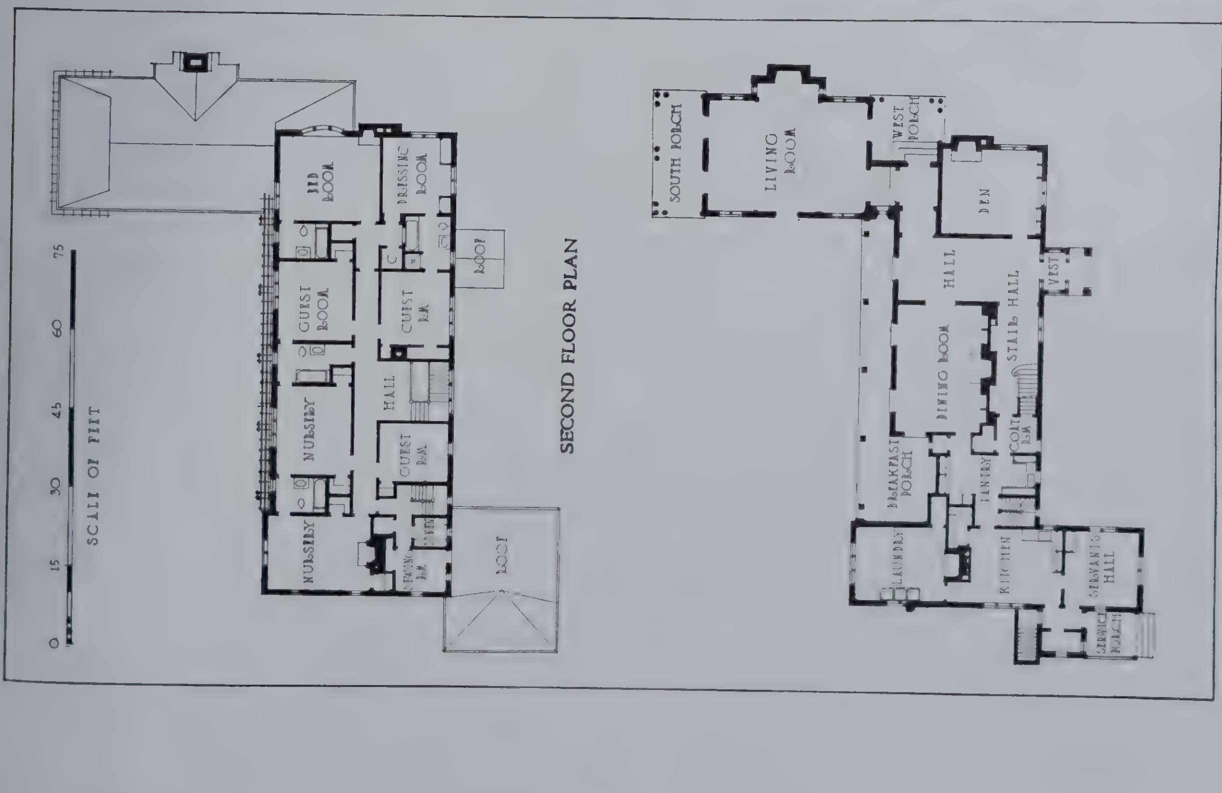
HOUSE OF DARRAGH PARK, ESQ., ROSLYN, LONG ISLAND, N. Y.

PEABODY, WILSON & BROWN, ARCHITECTS

DETAIL OF ENTRANCE PORCH

HOUSE OF DARRAGH PARK, ESQ., ROSLYN, LONG ISLAND, N. Y.

PEABODY, WILSON & BROWN, ARCHITECTS



SECOND FLOOR PLAN

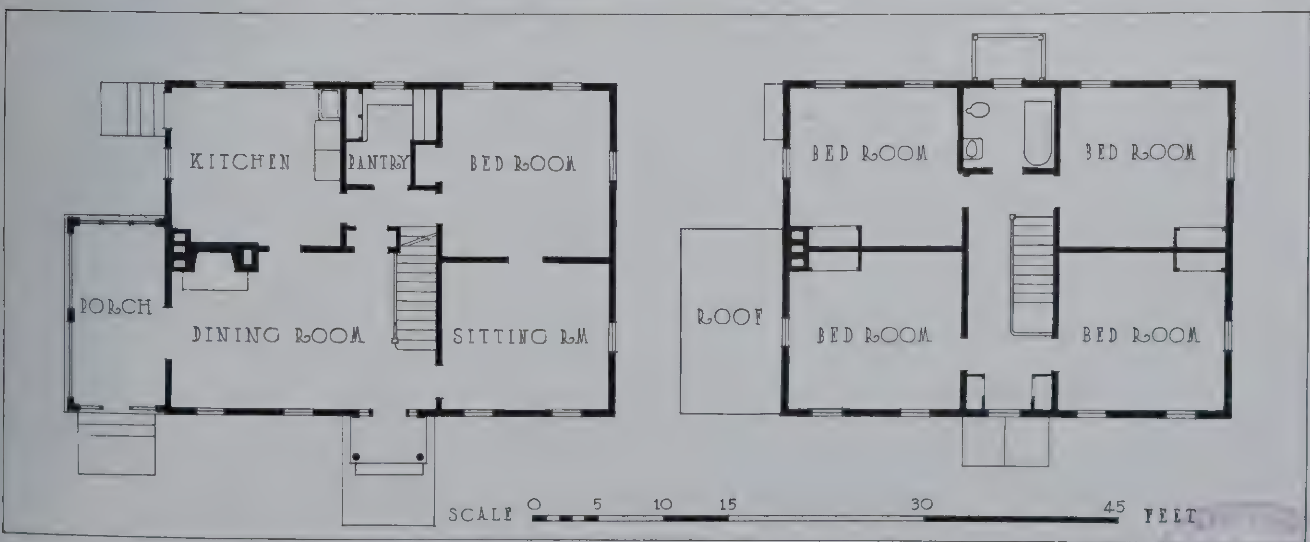
FIRST FLOOR PLAN

LIVING ROOM

DINING ROOM

HOUSE OF DARRAGH PARK, ESQ., ROSLYN, LONG ISLAND, N. Y.

PEABODY, WILSON & BROWN, ARCHITECTS



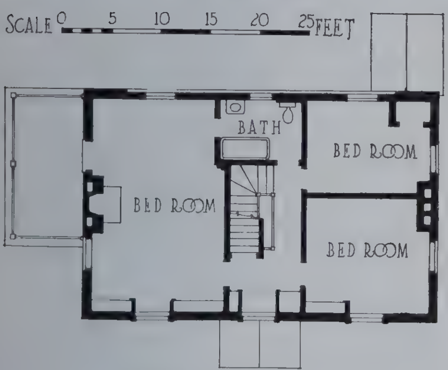
FIRST FLOOR PLAN

SECOND FLOOR PLAN

SUPERINTENDENT'S COTTAGE, ESTATE AT YONKERS, N. Y.

ALFRED HOPKINS, ARCHITECT

GENERAL VIEW



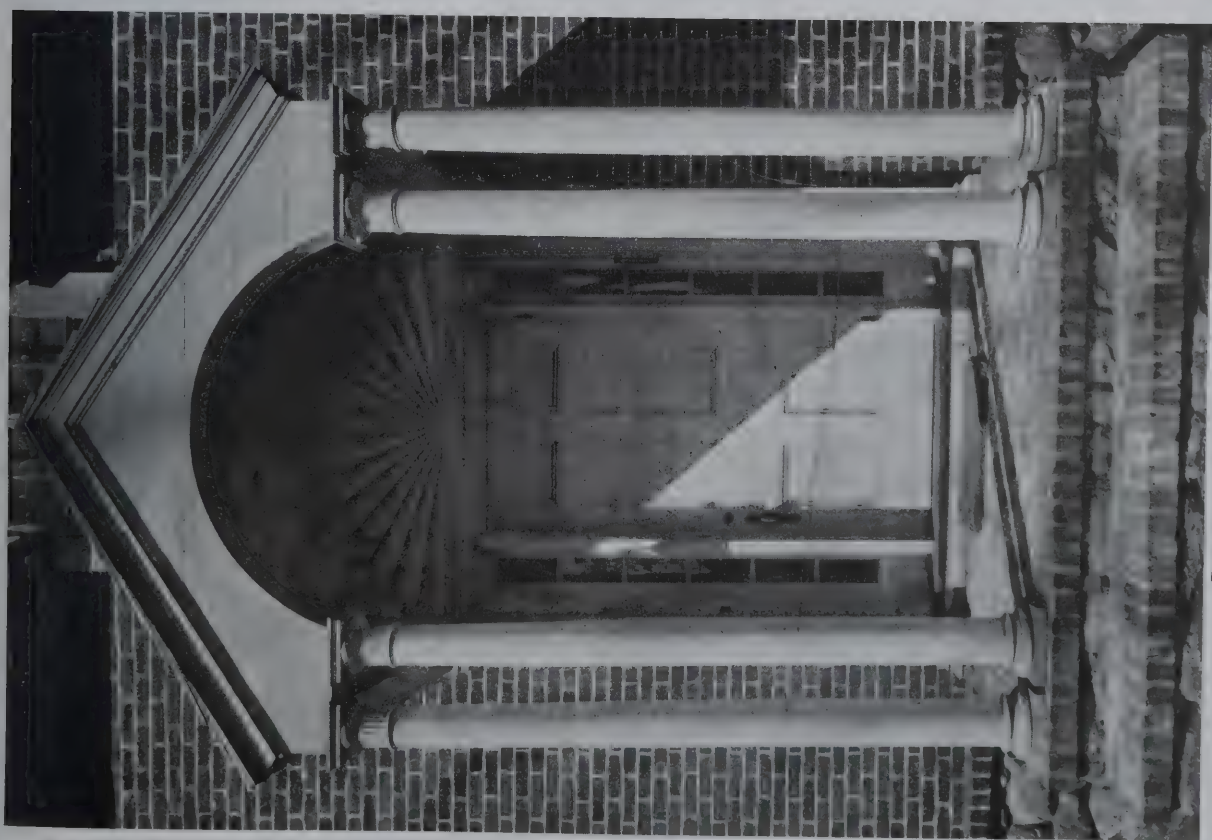
SECOND FLOOR PLAN

FIRST FLOOR PLAN

DINING ROOM

HOUSE OF WILLIAM V. MACDONALD, ESQ., BELMONT, MASS.

STANLEY B. PARKER, ARCHITECT



DETAIL OF ENTRANCE PORCH

VIEW OF FRONT

HOUSE OF WILLIAM V. MACDONALD, ESQ., BELMONT, MASS.

STANLEY B. PARKER, ARCHITECT

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Straight Talks with Architects

III. WILL YOU GET YOUR SHARE?

TWO months ago in this Department of THE FORUM the subject under consideration was the possibility of getting work immediately in architects' offices. Last month we discussed some of the individual and collective weaknesses which have operated to the detriment of the architect and of his profession. Some of the predictions which were made in these articles have already come true. We find today a peculiar condition in the profession, which is shown by the fact that a considerable number of architectural offices are very busy, while an even greater number have little to do. As we analyze this condition further, it soon becomes evident that the architects who are busy are of the aggressive type and those who are not busy are numbered among those who wait.

The question of selling architectural service is one which has been discussed from practically all possible angles. There are many architects who hold the opinion that a definite attempt to sell architectural service is unethical. On the other hand, it must be realized that almost every architectural commission is obtained by salesmanship in one way or another; it may not be through the employment of the principles of direct salesmanship, but through the more indirect method of developing social contacts or waiting for commissions to come into the office through the recommendation of satisfied clients.

Just a few days ago we were in the office of a well known architectural firm. We found little action there—the working force had been reduced to almost a minimum—the drafting boards were covered and an air of inactivity pervaded the entire premises. We could not help but contrast this condition with that of an office visited the day before, where millions of dollars' worth of apartment houses were being designed to meet the active demand existing in the sections of New York directly affected by the tax-exemption ordinance. The former office has for years borne a high reputation in the architectural field; the latter, where work was active, is not so well known, but is destined to be one of the great architectural firms of the next decade.

In an interview with one of the principals in the idle office, we were asked: "Why is it that with so much activity going on in this district, we are not busy?" Our answer was in some detail and may be gathered from the statements made in these paragraphs. What we were really interested in was *why* the other office was so busy and *how* the work was being obtained.

In this office, after the passing of the tax-exemption ordinance in New York, a careful study of the trend of the real estate market was made, particularly to determine what class of buildings would be erected to take advantage of this tax-exemption. It was not difficult to guess that the new housing which would be provided must consist of moderate cost individual and two-family houses and apartment houses. It was felt that in sections of the city where land values were too high for individual houses, but low enough to construct moderate cost apartment buildings on a paying basis, activity on the part of speculative builders could be anticipated. This prediction was made even more sound by the fact that there were several districts of this kind where adequate rapid transit facilities had recently been provided.

To interest prospective investors in entering upon building ventures, facts and figures must be determined, and practical types of apartment houses designed to meet public approval must be evolved. All this meant a certain amount of gambling in time and effort, but having a definite objective in view, tentative plans of two or three buildings were prepared and prices of available real estate were determined. The next step consisted of direct selling, in which the architect visited a number of logical prospective clients and showed them exactly what types of buildings could be built; what they would cost, together with the land; what return might be expected on the investment, and what margin of profit for quick resale to ultimate investors might be expected. At first it was difficult to convince, but finally the first client decided to proceed with a venture of this nature. Soon after that others came into line and before long, in the section selected by the architect, a considerable boom was on the way, and the reputation of having designed some of these buildings brought in more and more work, until the office had reached the busy stage in which we found it.

Studying the Business Phases of Each Project

Perhaps the strongest favorable impression which can be made upon the client of an architect is developed when the client realizes that his architect

is possessed of sound business judgment. The impression is strengthened again if the architect seems to possess more than the usual amount of knowledge regarding the particular purpose for which the building is planned.

Not long ago there came to our attention a project which involved the design and construction of a large office building. This building was being built as an investment and paid for out of war profits. Tentative plans had been filed as prepared by a prominent firm of architects. Shortly thereafter we noted the filing of a new set of plans by a younger architect, who as yet had carried out no large project of this nature, although in the course of his previous employment he had been with firms where such experience was available to him. Being acquainted with one of the principals of the owning company, we inquired the reason why this architect had been employed rather than the prominent firm which had prepared the first set of plans. It turned out that the cost of building from the first plans filed proved to be greater than was warranted by the expected revenue under conditions that now hold, and the building project was for a time dismissed. The younger architect learned of this and promptly made a study of the tentative plans, calling into consultation an experienced building manager. Many defects which would reduce the rental income and increase the cost of maintenance were found in the first set of plans and an entirely different set of sketch plans was developed in which it was clearly indicated that the cost of maintenance and operation would be less, while the space was utilized to provide a greater income on the same expenditure of money.

Those who have money to expend in the building field today are generally hard headed business men who respond more quickly to an appeal made along business lines than through the æsthetic appeal of a well designed exterior. Realizing this fact, the younger architect did not present at the first interview an elevation or perspective, but merely based his argument on the floor plans which he had developed, saying that if they were further interested, he would be glad to show the elevations of the proposed building. Proceeding thus along businesslike methods of approach, this architect was able to bring into his office the largest commission he had ever handled. The fault with the larger organization is to be found in the fact that they did not realize the value of consulting a building manager, and had merely produced another office building, well designed it is true, but showing the same waste of space and disregard of maintenance cost that are to be found in the average hotel building and many office buildings today.

Entirely aside from the architectural and engineering problems involved in a new building project, we believe that the first idea on the part of the architect should be toward making the building a machine highly efficient in accordance with its intended purpose. This means not only a study of the plans of other buildings which in times past have been built for a similar purpose, but an actual examination on the ground of the functioning of these buildings to determine through experience of others those points which should be incorporated in planning a new building, or items of design and equipment which for one reason or another should be omitted. To illustrate this point, we may refer briefly to one instance. In this case the architect had drawn plans for an office building and had incorporated the equipment for a stationary vacuum cleaning plant. Fortunately, and largely through the insistence of the owner, his plans were gone over by a building manager. Among many recommendations was one to the effect that the portable type of vacuum cleaner would represent considerable less investment and a lower cost of operation and provide eminently satisfactory service for the particular building. The architect investigated and obtained data on several installations of each type in buildings of similar size and kind, finding that the building manager's judgment was correct and saving the owner a sizable item in original building cost.

Follow Construction Costs Closely

In the past, architects have often been charged with failure to keep closely in touch with actual conditions in the building field and failure to maintain a thorough working knowledge of costs. The result has been that in preliminary discussions of a project, and even in the preparation of sketch plans, the architect's tentative cost estimates have often proved misleading to the client. To such an extent has this been true that there are on record many instances where a client has refused to go beyond the sketch plan stage, because the cost seemed too high, when in reality a careful combing of the field might have resulted in obtaining information upon which a lower cost could be based.

Another period of disappointment to the client is the time when he has ordered working drawings and specifications to be prepared on a basis of estimates furnished him by the architect. When actual contract and sub-contract figures have been obtained, it is quite often found that these figures are much higher than the estimate given by the architect. This is a situation which in nine cases out of ten serves to discourage the client and to prevent the carrying out of the project. If it is found difficult to obtain comparative costs in order to provide a tentative estimate, it is much better to inform the client frankly that the tentative cost estimate was based only on general information and that the actual figures cannot be had until plans have been developed to a point where actual estimates on material and labor can be obtained. The average client, particularly in the case of owners of business buildings, will be found fair minded in this matter and appreciative of the architect's frankness and co-operation and his apparent willingness to serve the best interests of the client.

It is a great mistake to assume too much knowl-

edge, and this is a common error among architects today, particularly among those who are in the early stages of developing their practices. In view of the complexity of the modern building operation no reasonable person would expect an architect to know everything. Consequently, the best practice today involves the employment of consultants who are specialists, particularly in connection with the mechanical installation problems of a building project. Difficult problems of heating, ventilating, acoustics, fireproofing and structural engineering should never be undertaken excepting under the guidance of consulting engineers or with the services of a staff member who has a thorough knowledge of the subject involved. In cases where the project is tentative in its nature, and the architect may be doing a certain amount of preliminary work, it will be found that the average consulting engineer is entirely willing to co-operate on a very reasonable basis. Similarly, in problems of actual construction, it is the part of wisdom to consult with a practical building contractor or sub-contractors in order to incorporate practical features in planning and to avoid mistakes which are commonly found in working drawings and specifications tendered to bidders.

Standardize Your System of Charges

In analyzing the methods of charging clients for services by various architects, we have been frankly surprised to find how many are working on some form of cost-plus basis. It would seem that we are now in an evolutionary period, not only regarding the scope of architectural service but also the method of charging for it. As a basic consideration, it is evident that a professional service of any kind will be paid for by the public, not on a standard charge or percentage charge, but in accordance with the experience and ability of those who render such service. This condition has been generally accepted in the legal and medical professions, among others. On the other hand, many architects have attempted to adhere to a fixed or standardized percentage of charges, based on the type of work involved. There has been too little consideration of the differential which enters into the situation because of the factors of skill and experience. Again, we have to consider the varying degrees of complexity in a building operation and the question of repetition of design in such cases as that of an industrial or other type of group housing project. Some of the methods of charging for service which have been brought to our attention are:

1. The straight percentage method, such as that suggested by the American Institute of Architects.
2. The lump-sum method, in which a price is quoted for full architectural service on a given project.
3. Various forms of cost-plus charges.
4. Salary basis.

The majority of architects work directly on a percentage basis, receiving fees which must include their operating expenses, leaving the balance for profit. The percentage charges vary considerably, depending upon the size of the project and the amount of work involved. The usual basis, however, quite closely approximates the schedule of charges as set forth by the American Institute of Architects.

The lump-sum method has been experimented with on numerous occasions but has been found generally unsuccessful, excepting in the speculative building field, where it is quite customary to maintain a standardized series of lump-sum charges, which may be so much for the plans of an individual dwelling under certain cost limitations, so much for the plans of a two-family house, and plans of apartment houses which are sometimes estimated on the basis of cost of architectural design per front foot. Naturally, there are many variations in this system of charging, and in most instances the architectural work does not include the preparation of detail drawings and specifications, as this work is done by the building contractor or speculative builder through his own organization and to a great extent through the offices of his sub-contractors.

The cost-plus system of charging seems to be gaining in favor. Briefly, this consists of arranging a contract with the owner by which he is to pay the actual costs, which are increased (usually doubled) to cover the overhead expense, and above this a percentage of the actual expenditure thus determined is allowed the architect for profit, the average being about one-third of the cost as estimated on the actual expenses-plus-overhead basis. Under this plan payments are usually made on monthly statements rendered by the architects.

A variation of this plan involves a payment of actual cost of the work plus an overhead charge by the client, and a salary to the principal or principals who may be engaged at any time on the work.

There exists today in the average architectural office a great need for a revision and standardization of charges. In many instances the prospective client's complaint that architectural service costs him too much is grounded on fact. We may take one brief example for consideration. Under the ordinary system of charging for architectural service, which involves a series of percentages, the various stages of the work are based on the cost of the building. He would find that a simple type of industrial building, involving very little detail architectural work but costing perhaps one million dollars, would develop an architectural charge equal to that of designing a one million dollar hotel. The work involved in designing the hotel might require five times the effort and expenditure on the architect's part as that involved in designing an industrial building. Naturally, it seems unfair that a standard percentage charge should apply in this case. The adoption of the cost-plus form of charging, however, would obviate all such difficulties. Any of these forms of charges involves careful bookkeeping, so that the records may be open to the client at all times.

EDITORIAL COMMENT

CONSTRUCTION THE IMMEDIATE SOLUTION OF UNEMPLOYMENT

THE president's Conference on Unemployment has adjourned after a number of meetings attended by representatives of the varied fields of social and industrial endeavor. The deliberations of the Conference have not resulted in any formula for changing conditions immediately for the better. Hardly any thinking person entertained any idea that the outcome would be otherwise; the present unemployment is the effect of economic conditions that must of necessity change slowly, just as they were originally brought about. The Conference has, however, not been without purpose; it has concentrated the popular attention on a subject of great importance to the nation, and as well as could be done with the limited organization available it has gathered data and information which the delegates have been requested to use to the best possible advantage in their local communities—and it is in the many individual communities that the problem must be solved.

An interesting phase of the Conference was the emphasis placed on the construction industry as the source from which most immediate general help can come. It is a recognition of the claims of many in the industry that construction is a "key" industry and emphasizes their objections that as such it has not been accorded its true importance in the fields of finance, government and transportation, all of which have laid upon it heavy burdens, while at the same time a determined fight was required to overcome adverse general economic conditions.

The Conference points to construction as the only immediate source of help and makes a special plea that public officials proceed with all road and public building construction for which funds can be made available. The number of men that such work can employ in a direct manner is large, but even of more importance is the work indirectly created for others because of the demand for construction products from the quarry, mill, foundry and factory. The Conference estimates that more than 2,000,000 people could be employed in construction.

The difficulties that must be overcome, as given by the Conference, are those that everyone connected with building knows—they are financing, material costs and labor costs. They present questions which cannot be answered in a national sense; they must be investigated in each community for itself. As formulated by the Conference they are:

1. Can the prospective investor finance the operation at a reasonable cost?

2. Does the cost of construction materials to the prospective investor properly represent the reduction which has been made in the wholesale prices?

3. Is labor in the particular locality working at fair rates and giving fair value in the quantity and quality of work done?

If local conditions permit a satisfactory answer to these questions, there is no reason why work should not proceed immediately. The report of the Committee on Construction Industries to the Conference makes this pertinent comment on these phases of the problem:

Financing "In every section of the country owners have declined to start new projects on account of the financing charges, both the interest rates and the commissions and premiums paid for floating loans being discouragingly high. Commissions and premiums varying between 10 and 20 per cent have been charged, in addition to from 7 to 8 per cent interest. It is doubtful whether the margins received by architects, contractors and all the producers in the basic industries involved in construction aggregate a sum equivalent to these financing charges.

"The savings deposits of the people are the natural economic source of loans for home building. The aggregate is ample for this purpose, even though a portion is protected by adequate investment in more liquid securities to meet withdrawals. There would be no difficulty in the financing of homes if the fundamental principle of the use of long term deposits for home loans and other long term uses were generally followed.

Material Costs "Manufacturers of building materials should be urged to make their readjustments promptly to a reasonable basis. They must realize that failure on their part to do so is not only limiting their own business but it is also interfering with the production and sale of other construction materials.

Labor Cost "This cannot be regulated by national action. The cost of living, rentals and working conditions differ in various communities. Where fair wage adjustments have not been made, construction is held up. Such conditions should be dealt with fairly and frankly between employers and workmen, and reasonable readjustments promptly made."

The value that the Conference placed upon the resumption of construction is seen in the recommendation that Secretary Hoover appoint a committee selected from the various elements interested in construction to be known as the Committee on Construction Development, which will be charged with the responsibility of preparing plans for co-operating with the governors and mayors in the several states and cities in carrying on community conferences to the end that local restrictions may be eliminated.

DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

It will be the purpose in this Department to illustrate, as far as practicable, modern interiors furnished with articles obtainable in the markets, and the Editors will be pleased to advise interested readers the sources from which such material may be obtained

ORIGINAL XV CENTURY ITALIAN SACRISTY CUPBOARD
BOSTON MUSEUM OF FINE ARTS

THIS excellent example of Italian renaissance cabinet work formed a part of the Davanzati collection of Italian antiques. It was procured for the Museum at the Davanzati sale held in New York a few years ago, which was so largely responsible for the recent revival of American interest in Italian interiors and furniture. The illustration shows its setting in the Hall of Tapestries at the Museum.

Interiors Adapted from the Italian

PART III. FLOORS AND TRIM

By WALTER F. WHEELER

IN planning interiors in the Italian style particular importance attaches to the treatment of floors, for with interiors so simple and direct in character it is necessary that floors be in keeping with their surroundings. The floor is essentially a foundation for the room and should suggest strength and solidity; for this reason the colors used upon floors should be darker than those in walls and ceilings and every effort should be made to use materials which by their very nature add an appearance of stability.

There are instances where floors in loggias, vestibules or entrance halls may be paved with flat stones of irregular shape, if not too rough in character. An extremely good treatment for use in such cases, or even for a simple interior where expense is a consideration, would be a natural gray cement floor lined off into squares, with narrow lines of black cement paint, or else every alternate square painted black. Such squares might be from 12 to 18 inches on a side and the lines themselves from ½ inch to ¾ inch in width. Cement offers many attractive possibilities in the usual forms of terrazzo or in combination with tile or metal inserts.

Brick, in various forms, provides excellent floors for rooms arranged in the Italian style and its moderate cost supplies another argument for its wider use. The well known Roman brick which is widely used in Italy for flooring is easily to be had in America and excellent results may be had by placing two such brick side by side and then cutting off the corners of the oblong thus formed making a hexagonal shape which forms a useful paving unit. Where a large surface is to be paved the expanse may be broken by bands of brick laid in a manner different from that used for the rest of the flooring and these bands may be of contrasting colors.

The use of quarry tiles marks the step to the form of flooring to be next considered. They may be had in a large number of colors and when choice is made of an appropriate color and a fitting contrast is obtained in selection of a color for mortar, a successful result may be expected. Tiles of many kinds are offered in the market and many are well

Courtesy Doubleday, Page & Company

Italian Wall Cabinet Suitable for Modern Bookcase Design in Italian Interiors
Example of favorite lozenge shape panels with raised mouldings

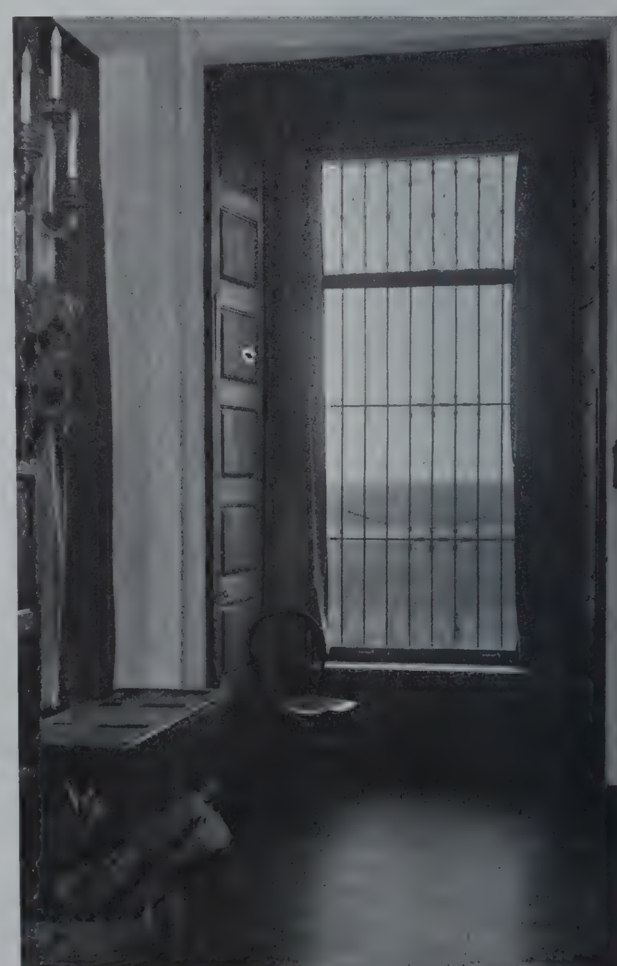
Original XVIII Century Venetian Polychrome Door
Courtesy of Paul Chalfin

suited to Italian surroundings. Their selection must always be governed by a proper regard for the reserve which in interiors of this type is quite necessary and it will be generally found that a single toned, undecorated tile of pleasing geometric shape will make a satisfactory, restful floor.

Wooden floors may be of several types and among them are parquetry and matched boards in geometric patterns. Wide boards, keyed together with the keys plainly visible, are highly appropriate and use might be made of oak or some other close grained native wood, stained to a dark, soft brown. These floors are frequently laid with square edged boards and with the joints purposely left open and filled with a black mastic compound that helps to create a sense of rugged construction.

The furniture workers of America, whose success in reproducing excellent examples of Italian furniture of the late fifteenth or sixteenth century has been already pointed out, have not been more resourceful in adapting the spirit of the older age to the requirements of today than the makers of floor coverings of different kinds. Unless an architect has given the subject a thorough investigation it would be difficult to realize the extent of the variety which is offered. Among the materials which are useful in furnishing interiors of the Italian type are many kinds of "fabricated" floor coverings, such as various forms of linoleum and a number of cork products such as tiles and carpeting. These materials are to be found in plain colors, in squares of contrasting colors, and also in tile and marble patterns, and since they are to be had in units of convenient size, are easily installed and give excellent service, they are being widely used.

The Italian interior is generally dominated by the fireplace. A study of illustrations of such interiors as are included here will show that considerable variety is possible in the treatment of mantels, but that almost all successful examples are of stone or of some modern substitute for stone or marble. Mantelpieces can be easily cast in cement from the architect's individual design, but the American market offers many mantels of various substances which are of excellent design and frequently exact copies or close approximations of mantels from well known Italian palaces and which are of quite moderate cost. In selecting or designing mantels for such surroundings it must be remembered that the scale of a mantel in an early Italian interior is quite different from that in the designing of a house based on Georgian or colonial precedent. In the Italian interior, the general scale is much larger; frequently the fireplace opening is almost high



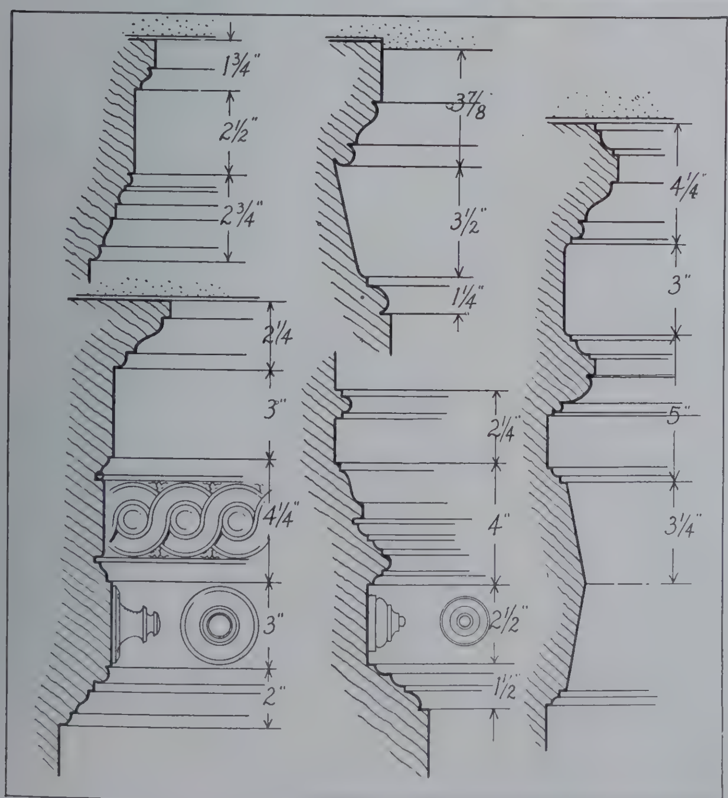
Window with Splayed, Paneled Jambs in Italian Style
Myron Hunt, Architect

enough to walk into and the effect, while lacking nothing in refinement, is far bolder and stronger and much more virile, in keeping with the more robust treatment of walls and ceilings.

There is considerable variety in the form which the Italian mantel may assume; the shelf of the mantel is not as important as with mantels of most other types, and frequently it disappears altogether. The "hooded" fireplace, which was inherited from the Gothic period, was often employed and it is much used today in interiors of this kind, for its form and general scale recommend it for rooms where lofty ceilings are the rule rather than the exception. Another favorite treatment called for the placing about the fireplace of merely a heavy bolection moulding which was generally of stone or marble. An instance of this treatment is illustrated and a section of the moulding is given on page 203.

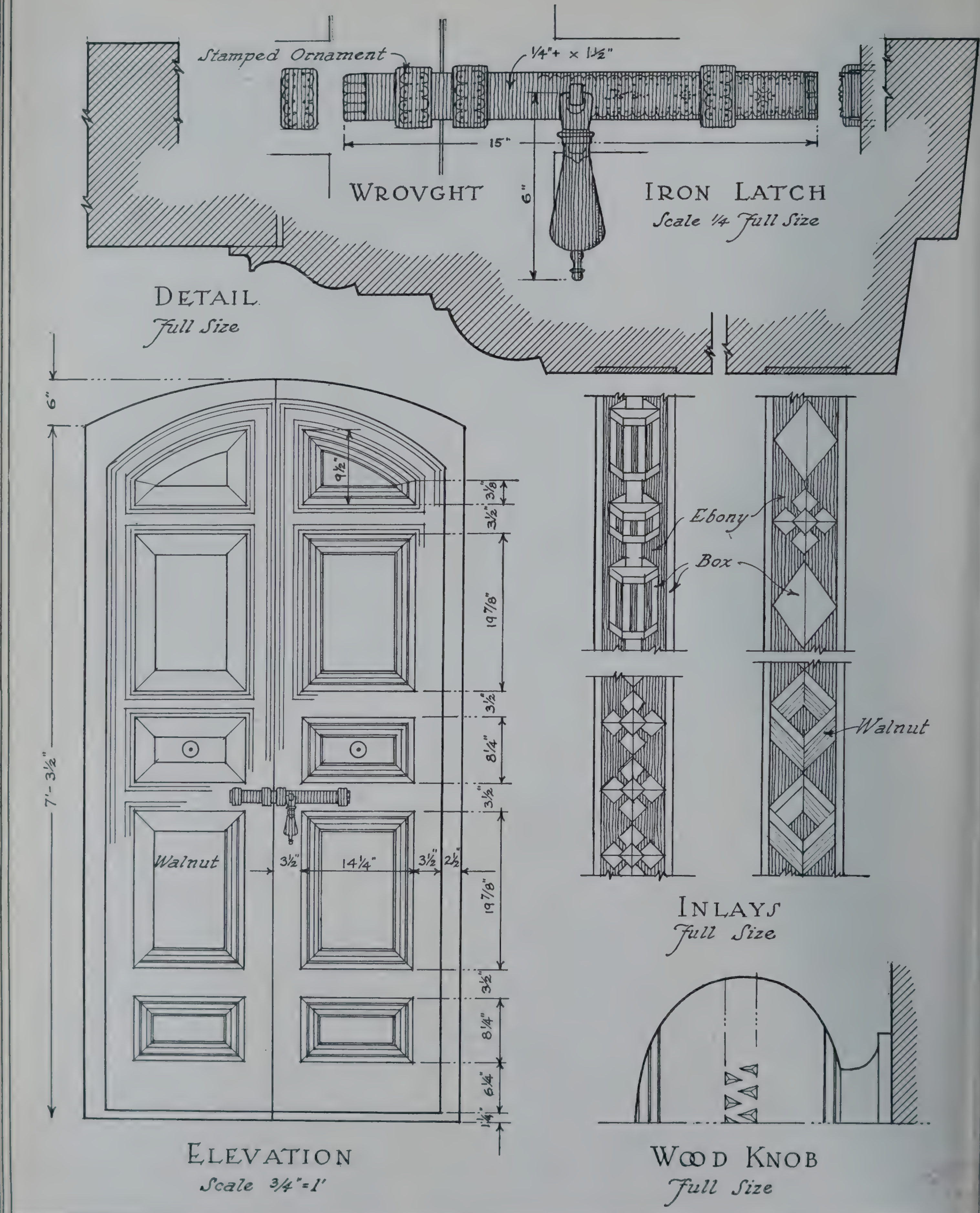
The highly developed chimney piece and over-mantel are not characteristic of this period except as the "hooded" fireplace may be so considered. The fireplace in the Italian room is nevertheless the dominating feature and this is achieved by the large opening and the vigorous moulding and carving of the stone mantel. The space above the mantel is generally left free for a tapestry, painting or sculptured ornament.

Doorway with Moulded Cement Architrave and Wood Paneled Doors in Italian Style
Bigelow & Wadsworth, Architects



Details of Mouldings from Five Italian Wood Doors
All are reproduced at the same scale

Trim is also a matter of much importance. In the discussion of ceilings in THE FORUM for October it was pointed out that much of the success of a ceiling in an Italian interior often consisted in the presenting of a strong and abrupt contrast to walls, but just the opposite condition obtains in regard to trim about windows and doors or the arrangement of baseboards, in planning which the effort is to make them appear to be a part of the surrounding walls. It is true that sometimes—as may be seen in a few of these illustrations—the detail about a door may be of wood and as different as possible in appearance from the walls, but in these in-



ITALIAN DETAILS 1921

INTERIOR DOORS PALAZZO DAVANZATI FLORENCE

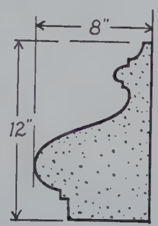
MEASVRED and DRAWN by HOWARD MOISE

stances the door frame is apt to be richly carved and probably polychromed and gilded, so that in effect it ceases to be a mere doorway and becomes an architectural asset of the first importance. Usually, however, the trim about doors and windows would be made extremely simple and inconspicuous—often flush with the plaster walls so that it was almost invisible, or else so concealed within the deep reveals that it was hardly noticeable, and almost always it would be painted or treated in some way to tie it into the walls, thus almost entirely concealing it. The baseboard, of course, was regarded as having only utilitarian value and was usually a mere protecting fillet a few inches high; often it was still further minimized and became a quarter-round at the angle between floor and walls.

In some instances, especially in rooms which are large and of considerable height, paneling was occasionally used to a height of five or six feet, with plaster or hangings above. Where paneling is used the panels should be in bold, vigorous scale, arranged in squares similar to English renaissance work but larger in size, often not less than two feet on a side and with a correspondingly vigorous cap. The mouldings of the panels may show some slight carving or use of carved beading and they offer as well an excellent opportunity for polychrome decoration in small areas of color.

Modern Door Designed in Accord with Italian Precedent
Richardson, Barott & Richardson, Architects

Among the important details of interior trim in the domestic architecture of Italy are doors and the wooden shutters or blinds which are often used. The older examples, made quite as much for protection as for architectural appearance, are paneled in various ways. These doors and shutters are



Above is Fireplace in Villa Caronia, Florence, with Detail of Moulding
Courtesy of E. F. Dodge

At Right are Two Mantels of Modern Manufacture, Based on Italian Originals

generally of walnut or chestnut, and like wooden ceilings are often polychromed or lightly decorated with gilt. Owing to the deep reveals made necessary by the thickness of walls, such doors and shutters are often surrounded by very little actual woodwork and in some old examples are fixed directly to the stone of the surrounding jambs.

Sometimes an excellent result may be had at a cost comparatively small by placing about a door opening a wide plaster band with face moulded edge; such a band, which really constitutes a form of trim, may be marbleized or given the same treatment as the surrounding walls for the slight shadows cast by the moulded edge will give the architectural emphasis which is required. It may be noted here that important doorways should be of generous width which of course involves the use of double doors. For such doors the Italian metal workers produced exceedingly well designed hardware—long strap hinges which extended across the entire width of the doors and huge locks, which were not mortised but left fully exposed. Sometimes the doors are studded with nails having richly ornamented wrought iron heads. American makers of hardware are particularly successful in their door hardware in the Italian style. To avoid too much cutting up of the walls only doors of real importance are given any architectural emphasis, minor doorways being often entirely concealed and made "blind" doors, which are almost invisible, since absolutely no trim is used and the doors themselves are precisely like the walls about them.

Much of the trim which is discussed here involves the use of mouldings which are of great importance in interiors of any type. The mouldings most successful in Italian interiors exhibit an accentuated difference between different members—some being robust, swelling surfaces while others are of small scale and quite deeply cut. There are however no sharp arrises, care being taken to round all edges to give a soft appearance. In paneling, the stiles are generally thin and narrow, the greater prominence attaching to the panel which is achieved by the use of wide mouldings which are often raised and frequently designed in the reverse, so that the depth of moulding coming toward the panel is greater than at the outer edge. The use of mouldings in interiors can be profitably studied from the furniture of this period because of its highly architectural character and the intimate relations which it sustained to the structural interior.

The treatment of windows follows, generally, that of doors. The more important windows were often extended to the floor and made to open, in the French fashion, in two folds. Owing to the depth of the walls the reveals would ordinarily be deep enough to take the windows or even the shutters which were sometimes used, so that hangings might be undisturbed on the plane of the main walls.

The thoughtful planning of the details of floors and interior trim goes far toward making a success of an Italian domestic interior, a type which depends for final effect very largely upon careful coordination of all the different parts to make up the setting or background which is afforded for furniture and other accessories.

A Modern Piece of Furniture Faithfully Reproducing an Italian Original and Carried by Dealers
Style of North Italian Early Renaissance. Length, 57 ins., width, 23 ins., height, 38 ins.

SERVICE SECTION
of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

The Present Lumber Market

By MAX MYERS
Vice-president, The Nicola, Stone & Myers Co., Cleveland

We present here through the courtesy of *Building Industry*, the official organ of The Builders' Exchange of Cleveland, an interesting statement of present lumber market conditions in Cleveland, which apply in general to large centers in most sections of the country. The paragraph on stocks in local yards is omitted because it particularly relates to Cleveland conditions, where the 50 or more yards carry an adequate stock.—THE EDITOR.

IN discussing the subject of the present lumber market, I am going to present it from four different angles:

1st. Conditions at the manufacturing or saw mill end.

2d. Transportation facilities.

3d. Stocks on hand in local yards.

4th. Prices.

Taking up No. 1, which pertains to conditions at the mill end, reliable reports from various associations in the South and the West indicate that the cut is 30% to 40% below normal. Many of the smaller mills have cut out completely; a great many of them have been forced to liquidate on account of poor business conditions, and some of the larger mills closed down some months ago because operation at that time meant a loss. Stocks on hand at the mills are very small, due to conditions stated above, and also due to the increased demand which has sprung up within the last month or six weeks. This increased demand comes from the railroads, from the South, which is prosperous on account of increase in cotton prices, and from a partial revival of the home building program, so long delayed. The railroads entered upon a large car repairing program several months ago and are now requiring large amounts of lumber, particularly of the better grades. The South is building more houses than at any time within the last eight or ten years. The Middle West and Eastern states all show improvement along home building lines, but industrial building is almost at a standstill.

Practically all this year transportation facilities have been in excess of requirements, whereas during and directly after the war we never knew when we could expect shipment and even after shipment, never knew when cars would arrive. Today we are obtaining prompt shipments and excellent service from the railroads.

Lately we have heard some rumors of car shortage in the South, but thus far it has not made itself manifest. The coal and crop movement, both of which are now due, will undoubtedly have its effect on the movement of lumber, but I do not look for any severe car shortage this fall or winter.

There was a time when lumbermen, in common with bankers, real estate men and safe fellows, were called profiteers. Just what measure of truth was in that statement so far as the other fellows were concerned, I do not know, but it never really applied to lumber. The fact of the matter is, lumber has been liquidated, deflated, readjusted, or whatever name our economic doctors give to letting the wind out of high prices.

In proof of this statement, I have put together some figures covering lumber prices in 1915, 1920 and 1921. My investigation shows that the lowest prices prevailing in the Cleveland market were in March, 1915, and the highest prices were in March, 1920; so the figures are based on those three periods.

COMPARATIVE LUMBER PRICES

25 Commonly Used Items Units of 1000 ft.	March 1915	March 1920 (Highest Peak)	Per Cent Increase 1920 over 1914	August 1921	Per Cent Decrease 1921 under 1920	Per Cent Increase 1921 Over 1914
No. 1 W. P. 1″	$40.00	$115.00	188%	$100.00	13%	150%
No. 2 W. P. 1″	34.00	100.00	194%	85.00	15%	150%
No. 3 W. P. 1″	30.00	83.00	177%	60.00	28%	100%
No. 4 W. P. 1″	29.00	73.00	152%	52.00	29%	79%
2x4 and 2x6 Y. P.	30.00	73.00	143%	42.00	42%	40%
2x8	31.00	74.00	139%	43.00	42%	39%
2x10	32.00	74.00	131%	43.00	42%	34%
2x12	34.00	75.00	121%	44.00	28%	29%
3x10	34.00	78.00	129%	55.00	29%	62%
4x4	32.00	73.00	122%	45.00	38%	41%
8x8	32.00	74.00	131%	50.00	32%	56%
12x12	37.00	80.00	116%	58.00	18%	57%
1″ B. and B. Finish	44.00	175.00	298%	87.00	50%	98%
1x6 B. and B. Siding	36.00	130.00	261%	60.00	54%	67%
1″ B. and B. Flg	38.00	155.00	308%	72.00	53%	89%
Clear Oak Flg	64.00	300.00	366%	127.00	58%	98%
Clear Maple Flg	55.00	240.00	335%	122.00	49%	122%
1″ C. and B. tr. Cypress	55.00	155.00	182%	129.00	17%	135%
1x6 No. 2 Y. P.	29.00	78.00	169%	37.00	53%	28%
1x8 No. 2 Y. P.	29.00	80.00	176%	39.00	51%	34%
1x10 No. 2 Y. P.	29.00	80.00	176%	39.00	51%	34%
1x12 No. 2 Y. P.	30.00	82.00	173%	39.00	52%	30%
6″ Cedar Siding	32.00	90.00	181%	55.00	39%	72%
1x8 Bung. Siding	40.00	110.00	175%	97.00	12%	143%
Shingles	4.50	11.00	144%	6.25	43%	39%
Grand Average	$35.22	$106.32	202%	$63.45	40%	80%

Important Note: It must be remembered that freight rates showed an increase of approximately 75% in the period from March, 1915, to the present time. This increase in freight rates amounts to from $5 to $6 per thousand feet of lumber. The average increase in the cost of lumber itself between the first and last dates should therefore be placed at 64% rather than at 80% as shown in the foregoing table.

Tax-Exemption Encourages the Expenditure of One Hundred Million Dollars in New Construction

THE experiment in New York in taking advantage of the tax-exemption enactment of the legislature has been watched with great interest from every section of the United States. The city ordinance which provided for such exemption releases for a period of ten years all residential construction, excepting hotels, from taxation to the extent of $5,000 of the appraised valuation per family, with a limit of $1,000 a room on apartments smaller than five rooms.

Henry H. Curran, President of the Borough of Manhattan, and an active supporter of the tax-exemption legislation, has recently analyzed the result of this enactment during the first four months of its life. The tax-exemption ruling did not go into effect until February, 1921, although it was made retroactive from April 1, 1920, to extend for a period of two years from that time. In the four months after February, 1921, plans for 20,897 homes were filed in the five boroughs of Greater New York. This is an increase of building of 215% over the same period the year before. Since the enactment of the exemption ordinance, plans for an average greater than 1,000 homes a week were filed. Of these plans a great number have been for moderate cost one- and two-family houses, of which over 12,000 were filed in the first four months. Tax-exemption also gave a great impetus to the building of apartment houses. Plans for 447 of these, housing 8,995 families, were filed in that period, representing an increase of 674% over the same period the year before.

Figured in terms of dollars, the tax-exemption means a saving for a period of ten years of over $1,400 per family. The fact that homes appraised for less than $5,000 are tax-free, and that houses of higher appraisal have the taxes materially reduced, makes this a negotiable saving from a real estate viewpoint. It is having the effect of stimulating sales, not only to prospective home owners but to those who purchase apartment houses on an investment basis.

This fall the definite working of the tax-exemption ordinance may be seen in all of the low land value districts of the five boroughs of Greater New York. Residential construction is booming and in many localities records are being broken. All this is directly the result of tax-exemption, combined with a decrease in the cost of construction. It means that with this decreased cost of construction, the actual cost of inexpensive dwellings is not far from pre-war levels, and it is on this basis that millions of dollars are now being invested in this field. Another natural result of tax-exemption has been to encourage the release of large amounts of mortgage money for moderate cost dwelling construction. Those who bitterly opposed the tax-exemption measure have been silenced entirely by the definite, beneficial results from the public viewpoint. Without question, tax-exemption should be encouraged in every section of the country where a reaction similar to that which has taken place in New York may be expected. Architects will find it to their advantage to bring up this subject locally. It may well be made a political issue, and certainly it should be a definite business issue, not only from the viewpoint of architects, but from that of the average local business man.

CONSTRUCTION COST AND VOLUME FIGURES

A VALUABLE service to those following the trend of costs is being supplied by the *Engineering News-Record* in determining an index figure to indicate monthly the cost of construction and the volume of building actually put under contract. The year 1913 in each case is accepted as normal and considered the base of 100%. The figures computed monthly show the gain or loss over corresponding figures of that year. The volume index figure is secured by determining what amount of money in 1913 would have been sufficient to buy the construction corresponding to total amounts of current contracts. This figure is then compared with the total amount of money expended for construction in 1913. It is recognized that 1913 was not a normal year in construction, but it is used as the base because of its general adoption in post-war statistics. Erratic results of comparison are avoided by comparing present monthly figures, not with figures of the corresponding month in 1913, but with the monthly average for the whole year.

The current index numbers are reproduced here. It will be noted that general construction cost is 35% cheaper than one year ago, 39% under the peak and but 66% above the 1913 level. In the volume index it will be seen that the actual volume of building under construction in 1921 is 15% under that of the first ten months in 1913. The October, 1921 figure shows the rate at which contracts are being let compared with the 1913 average.

Index Number Construction Cost

November, 1921	**166.32**
October, 1921	182.57
November, 1920	255.32
Peak, June, 1920	273.80
1913	100.00

Index Number Construction Volume

Monthly	
October, 1921	**109.00**
September, 1921	114.00
October, 1920	73.00
1913	100.00
Yearly	
1921 (10 months)	85.00
1920 (10 months)	98.00
1913	100.00

These tables are printed here through the courtesy of the *Engineering News-Record*.

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

FINANCE

WALTER STABLER

Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER

President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN

President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

SAFETY ENGINEERING

S. J. WILLIAMS

Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN

Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM and THE BUILDERS' JOURNAL.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise in this connection.

AUTOMOTIVE BUILDINGS

HAROLD F. BLANCHARD

For years a specialist in the layout and equipment of buildings of this type. Mr. Blanchard is a mechanical engineer and has practical knowledge of special conditions in many sections of the country through personal investigation.

FIRE PROTECTION ENGINEERING

J. D. HUNTER

Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.

President, The Agricultural Engineering Company, Columbus, Ohio. Professor and Head of Department of Agricultural Engineering, Ohio State University.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

LEGAL QUESTIONS

WILLIAM L. BOWMAN

Attorney, Member of the New York Bar

Specialist in legal matters pertaining to real estate and building contracts.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

	NEW ENGLAND						NEW YORK				
Item	Portland, Me.§	Boston, Mass.	Providence, R.I.	Hartford, Conn.	New Haven	New York City	Albany, N.Y.†††	Utica††	Syracuse★	Oswego	Binghamton
(1) Bulk Lime....per cwt.	....	....	....	....	....	....	....	....	....	$1.25	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$2.75	$3.20	$3.25	$4.60	....	....	....	$3.10	$3.10	3.90	$3.00
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	4.50	4.50*	4.60*	$4.50	$4.50*	$5.00*	4.65	4.60	4.75	4.50
(4) Crushed Stone....per ton	....	2.50	....	4.35	....	....	2.75	3.60	2.20	3.20	....
(5) Crushed Stone....per yd.	....	....	3.75	3.50	....	4.00*	....	....	2.64	5.25	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	.....	18.00	24.00	17.00	25.00	17.50	15.00	18.00	20.00	30.00	16.50
(7) Corner Bead, galvanized....per ft.	.05	.04	.05	.045	.05	....	.06	.05	.05	.05	.05
(9) Drain Tile, 6 in....per ft.	.15	.186	.30	.14	.125	....	.155	.129	.125	.07	.105
(10) Flue Lining, 8½ in. x 8½ in....per ft.	.30*	50%*	.36	.35	.33	....	50%*	.275	.30	.33	.33
(11) Flue Lining, 8½ in. x 13 in....per ft.	.45*	50%*	.54	.53	.495	....	50%*	.40	.45	.50	.50
(12) Fire Brick, Standard 9 in. No. 1 Clay....per M.	85.00	75.00	90 00	70.00	70.00	75.00	80.00	80.00	73.00	80.00	70.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags....per ton	......	25.00*	30.00*	25.00	21.43	15.00*	20.00	14.00	12.00	25.00	20.00
(14) Gravel, washed....per yd.	......	1.80*	2.00	2.50*	....	3.25*	2.00	....	....	....	....
(15) Hollow Building Tile (8x12x12 in.)....per M.	*	260.00	....	300.00	....	221.10	350.00*	240.25	250.00	275.00	300.00
(16) Hollow Building Tile (8x5x12 in.)....per M.	*	140.00	....	....	....	117.90	200.00	....	135.00	....	....
(17) Hydrated Lime (mason's) in 50 lb. paper bags....per bag	.50	.50	.80	.575	.55	.45	.60	.525	.60	.65	.50
(18) Hydrated Lime (finishing) in 50 lb. paper bags....per bag	....	.55	.85	.625	.60	.60	.70	.606	.70	.75*	.65
(19) Hair....per bu.	.50	.50	.55	.80*	.55	.60*	.75	.50	.50	.75	....
(20) Metal Lath, Exp., Gauge No. 24, weight 3.4 lbs.‡....per yd.	....	.2933	.38	.35	.33	.2933	.40	.33	.32	.45	....
(21) Metal Lath, Expanded, Gauge No. 25, weight 3 lbs....per yd.	....	.255	.37	.34	.32	.2260*	.38	....	.30	....	....
(22) Mortar Color, red....per lb.	....	.03	.03	.025	.03	.03	.035	.025	.05	.05	.03
(26) Partition Tile, Clay (4x12x12 in.)....per M.	....	140.00	220.00	160.00	170.00	153.50*	170.00	129.75	160.00	200.00	160.00
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.185	.24	.19	.20	....	.20	....	.16	....	.20
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)....per bbl.	3.20	3.20	3.30	3.18	3.20	2.80*	3.35	3.54	3.10	3.35	3.50
(30) Extra charge for each cloth sk....per sk.	.10	.10	.075	.075	.075	....	.10	.075	.075	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	....	75.00	....	....	....	....	...	....	50.00	75.00	....
(32) Plaster Board, ⅜ in. thick....per M. sq. ft.	....	32.50	40.00	28.00*	31.25	.23*	.28*	34.50	32.00	32.00	35.00
(33) Sand (Building)....per ton	....	1.55	....	....	....	....	....	2.50	....	....	4.00
(34) Sand (Building)....per yd.	....	2.50	2.00	1.50	....	1.80	2.00	....	....	4.00	....
(35) Sewer Pipe, single strength, off list....per cent.	30%	50%	40%	40%	45%	20%	45%	53%	60%	45%	50%
(36) Wall Coping, 9 in....per ft.	.20*	45%*	.32	.24*	.22	.32	45%	.36	.18	.22	.22
(38) Wall Plaster, neat, in paper, in 80 lb. bags....per ton	....	....	....	25.00	....	....	....	....	16.75	....	20.00
(39) Wall Plaster, neat, in cloth, 100 lb. sks, incl. sks....per ton	23.00	24.00*	24.00*	24.00*	28.00	22.00*	26.00*	20.00*	20.50*	22.50	19.00*
(40) Wall Plaster, sanded, in cloth, 100 lb., incl. sks....per ton	....	21.00*	21.00*	20.50*	21.00*	18.00*	20.50*	15.00	14.20*	22 50	17.00
(41) Wall Plaster, wood fibre, in cloth, 100 lb., incl. sks....per ton	23.00	24.00*	24.00*	24.00*	28 00	22.00*	26 00*	20.00	20.50*	25 00*	20.00
(42) Wall Ties, galvanized....per M.	....	12.60	....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
(43) Wall Plugs....per M.	....	35.00	35.00	....	30.00	30.00*	30.00	25.00	25.00	28.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	....	7.00*	9.50*	7.00*	....	8.50*	....	6.50†	7.00*	6.50*	6.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	....	3.00*	....	2.90	....	....	4.35†	2.65†	2.75**	3.00†	3.00*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	....	2.30§*	3.50§	4.25§*	....	....	2.88§*	2.65§*	2.25	2.25§	4.25§
(47) Stucco Board, Medium wt....per M. sq. ft.	....	50 00	....	55.00*	....	70.00	....	60.00*	55.00	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	55.00	....	60.00*	....	....	....	....	60.00	....	....
LUMBER ITEMS				†				†		*	*
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	....	13.00	9.50	13.00*	11.00	12.50*	12.00	12.00*	....	12.00	12.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	....	....	....	65.00	....	....	45.00	45.00*	....	40.00	45.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	38.00	40.00*	....	45.00	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	38.00	35.00*	....	40.00	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	....	....	....	....	....	....	38.00	40.00	....	36.00	....
(54) 1x4 "B" Flooring....per M. Board ft.	....	....	....	60.00*	....	....	90.00	85.00*	....	62.00	....
(55) Yellow Pine Clear Finish....per M. Board ft.	. . .	....	....	80.00	....	....	90.00	90.00	....	75.00	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	60.00*	....	....	....	65.00	....	75.00	....
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	....	....	....	....	....	....	....	65.00*	....	50.00	....
(58) Cypress Finish Lumber....per M. Board ft.	....	....	....	125.00	....	....	150.00	160.00	....	160.00	....
(59) ¾x4 "B" Partition....per M. Board ft.	....	....	....	60.00	....	....	....	75.00*	....	75.00	85.00
(60) ½x4 "B" Ceiling....per M. Board ft.	....	....	....	50.00	....	....	....	60.00*	....	50.00	60.00
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	....	....	....	60.00*	....	....	58.00	60.00*	....	60.00	....
(62) Mouldings, Yellow Pine....over list	....	....	....	50%	....	....	.015	1.25	....	.015*	....
(63) Washington 16 in., 5/2 Clears....per M.	....	....	....	....	....	....	6.75	7.50	....	6.20	6.75
(64) Washington 16 in., 5/2 Clears....per sq.	....	....	....	....	....	....	5.50	6.00	....	5.10	....
(65) Canadian 6 in., 5/2 xxxxx Clears....per M.	....	....	....	7.00	....	....	....	7.50	....	6.75	7.75
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	6.00	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow PineBoards...per M.	....	....	....	35.00*	....	....	38.00	4.00*	....	45.00	63.00*
ADDITIONAL ITEMS											
(68) Stucco, Cement....Per Sq. Yd.	....	....	....	....	....	....	....	.60	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags....Per Bag.	....	....	.30	....	....	....	.10	....	.30	....	....
(71) Wall Board (Please Note Kind)*....Per Sq. Ft.	.0435	....	.05	.055	....	....	.04	.036	.045	.045	....

*(Above Item 49)—No lumber revisions received for this issue from this city.

§Portland, consumer prices; contractor quotations on application.

†††Albany allows 10% and 2% off to contractors if paid by 10th of month following delivery.

†Above Hartford Lumber prices means prices advancing at wholesale.

†Above Utica lbr. items means prices at yard, add 25c per load for delivery less than 1,500 ft. and 40c per load for over 1,500 ft.

Lime, Barreled (Item No. 3)—Providence, Albany, common; 300 lb. barrel, New York City; Hartford, price for finishing lime, common, $4.30. **Hydrated** (Items 17, 18)—Oswego, per bu. of 70 lbs.

Crushed Stone (5)—New York.

Flue Lining (Item 10, 11)—Boston, Albany, off list. Portland, 50% off list, 10% cash discount in 15 days.

Fire Clay (Item 13)—New York City, 100 lb. bag rate; no credit for returned cloth sacks, Boston, New York, Providence.

Gravel (14)—New York, $2.75 to $3.25. Boston, Hartford, per ton.

Hollow Building Tile (Items 15-16)—Portland, not stocked in Portland; Albany, heavy, less 10% and °%.

Hair (19)—New York, per lb.; Hartford, 4 lbs. per bu.

Metal Lath (Item 21)—New York City, Gauge 26.

Par. Tile (26 & 28)—New York, less than 2,000 ft.

Portland Cement (Item 29)—

Plaster Board (Item 32)—New York City, Albany, price for each, size 32x36x⅜ in.; Hartford, 32x36x⅜.

Wall Coping (36)—Boston, per cent. off; Hartford, 8 inch; Portland, 30% off list, 10% cash discount, in 15 days.

Wall Plaster (38, 39, 40, 41)—Returned bags, Syracuse, Utica, Providence, New Haven, 15c; Albany, Oswego, 10c each; Boston, 12c each; Hartford, 13c, come for bags; New York City, 25c. Sacks extra, Binghamton.

Wall Plugs (Item 43)—New York, chiefly hardware dealers.

Roofing, Slate Surf. (Item 45)—70 lbs., Syracuse.

Roofing, Smooth Surf. (Item

bany; 3 ply, 63 lbs., Utica.

Stucco Board (Items 47, 48)—Hartford, Utica, creosoted.

(Item 49)—Hartford, Utica, spruce; New York City, Eastern spruce, $11.50 to $12.00. (Item 50)—Utica, 10 and 14 ft., $45.00; 16 ft., $47.00. (Items 51, 52)—Utica, 1x6 and 1x8 inches. (Item 54)—Hartford, B Flat; Utica, B & Btr.; grain. (Item 56)—Hartford, fir; (Item 57)—Utica, spruce; (Item 59-60)—Utica, B & Btr.; (Item 61)—Utica, 6 in.; Hartford, 6 in. Red Cedar; (Item 62)—Oswego, per inch; (Item 67)—Binghamton, Hartford, No. 2 C.; Utica, No. 2 Com.

Wall Board; (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. NEW YORK, PENNSYLVANIA, NEW JERSEY

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

		Elmira	Rochester,	Buffalo★	Jamestown, N. Y.	Allentown, Pa.	Erie	Philadelphia	Reading	Pittsburgh	Scranton	Newark, N. J.	Paterson, N. J.
(1) Bulk Lime	per cwt.	....	....	....	....	$0.75	....	$0.55	$0.65*	$1.00	$0.80	....	....
(2) Barreled Lime, 180 lbs. (net) bbls.	per bbl.	$3.60	$3.00	$2.50	....	3.00	$3.25	.75*	....	2.75	2.80	$3.15*	$ 3.21
(3) Barreled Lime, 280 lbs. (net) bbls.	per bbl.	5.25	4.75	....	....	4.00	5.10	....	....	....	....	....	5.00*
(4) Crushed Stone	per ton	....	2.50	....	....	2.00	2.30	3.75	2.00	5.50*	2.75	3.35	....
(5) Crushed Stone	per yd.	2.50	2.00	....	....	....	....	....	....	....	....	4.00	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	30.00	17.00	22.50	$25.00	17.00	23.50	20.00*	20.50	16.00	20.00	21.00	18.00
(7) Corner Bead, galvanized	per ft.	.07	.05	.05	....	.06	.04	.035	.05	.06	.06	.05	.09
(9) Drain Tile, 6 in.	per ft.	....	.11	.12	....	....	.095	....	....	.12	.14	.1675	.17
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.50	.30	.26	.42	.34	.27*	.36	.36	.30	.25	.30	.31
(11) Flue Lining 8½ in. x 13 in.	per ft.	.65	.45	.41	.63	.52	.40*	.54	.54	.45	.36	.45	.47
(12) Fire Brick, Standard 9-in. No. 1 clay	per M.	80.00	65.00	60.00	75.00	72.00	70.00	75.00	70.00	....	65.00	69.00	....
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	20.00*	20.00	12.00	30.00*	18.00‡	15.00	22.00	15.00	20.00*	20.00*	17.00	1.50*
(14) Gravel, washed	per yd.	2.00*	2.75	....	....	....	3.50	2.25*	4.00*	2.00*	2.00*	4.20	....
(15) Hollow Building Tile (8x12x12 in)	per M.	220.00	230.00*	200.00	....	212.50	....	....	....	135.80	260.00	240.00	260.00
(16) Hollow Building Tile (8x5x12 in.)	per M.	....	250.00*	95.00	110.00	111.20	70.00	....	....	60.00	....	110.00	....
(17) Hydrated Lime (masons) in 50-lb. paper bags	per bag	....	.475	.45	.59	.40	.475	.40625	.60	.50	.50	.50	.45
(18) Hydrated Lime (finishing) in 50-lb. paper bags	per bag	.75	.50	.45	.59	.58	.50	.5375	.75	.55	.60	.60	.55
(19) Hair	per bu.	.65*	.75*	.48	....	.75*	.15*	.40	.50	.75*	.70*	.70	.15*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.40	.37	.35	.39	.36	.37	.33	.33	.32	.31	.36	.40
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	....	.35	....	....	....	.30	.30	.30	.32	....	.35	.43
(22) Mortar Color, red	per lb.	.06	.05	....	.05	.035	.03	.035	.05	.0225	.06	.03	.03
(26) Partition Tile, Clay (4x12x12 in.)	per M.	150.00	110.00	100.00	....	138.00	90.00	230.00	....	72.40	140.00	140.00	150.00
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	.12	.14	.16	.17	....	.19	.19	....	....	.195	.21
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	3.20	3.00	2.85	3.15	2.60	3.10	2.85	3.10	2.60	3.00	2.80	2.64
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	.....	50.00	....	....	75.00	....	....	55.00	....	45.00	51.00	55.00
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	33.75	32.00	38.75	37.50	38.00	50.00	40.00	37.50	50.00	35.00	32.50	.25*
(33) Sand (Building)	per ton	....	....	....	....	3.50	3.50	....	3.80	2.00*	3.00	2.10	2.60
(34) Sand (Building)	per yd.	4.00*	2.50	....	....	....	3.00	2.05	....	....	3.00*	2.50	2.75
(35) Sewer Pipe, single strength, off list	per cent.	40%	45%	50%	40%	39%	55%	38%	50%	50%	50%	45%	45%
(36) Wall Coping, 9 in.	per ft.	.25	.22	.22	.28	.23	.18	.248	.22	.20	.26	.22	.28
(38) Wall Plaster, neat, in paper, in 80-lb. bags	per ton	19.00	20.00	....	22.00	....	....	....	....	22.00	....	....	....
(39) Wall Plaster, neat, in cloth, 100-lb. sacks, including sacks	per ton	23.00	19.00	18.00	22.00*	25.00*	25.00	22.50*	25.00	24.00*	24.00*	22.00	25.00
(40) Wall Plaster, sanded, in cloth, 100-lb., including sacks	per ton	23.00	21.00	13.00	21.00*	22.00*	17.00*	17.50*	22.00	20.00*	17.40*	16.80*	17.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb., including sacks	per ton	23.00	19.00	18.00	22.00*	....	25.00*	22.50*	....	24.00	24.00*	....	28.00
(42) Wall Ties, galvanized	per M.	5.00*	5.00	5.00	5.00	3.50*	3.50	6.00	5.00	3.00*	....	5.00	4.00
(43) Wall Plugs	per M.	22.50	25.00	20.00	....	25.00	....	....	....	....	....	....	26.00
(44) Asphalt Shingle (*singles; †stripped)	per sq.	6.50†	6.50†	....	7.50*	7.50†	7.00*	8.00	7.00	7.00†	7.00*	7.45	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.00**	2.75**	....	3.25*	3.00	....	....	2.75	3.00	3.00*	3.00*	....
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.00§*	3.25§*	....	2.85§	2.90	....	....	....	....	1.50*	3.15§	....
(47) Stucco Board, Medium wt.	per M. sq. ft.	55.00	55.00*	55.00	....	55.00	60.00	....	50.00	55.00	50.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	55.00	55.00	68.00	70.00	65.00	55.00	60.00	55.00	....	70.00
LUMBER ITEMS						*			*	*	*		
(49) Wood Lath, No. 1 (Size 4 ft.)	per M.	12.00	....	....	13.00	11.50*	12.50	12.00	12.00	12.00	11.50	12.50*	12.50
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	46.00*	....	....	40.00	42.00	42.00	....	42.00	44.00	40.00	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	....	....	....	45.00	....	45.00	60.00	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	46.00*	....	....	40.00	42 00	45.00	....	40.00	43.00	45.00	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	38.00	....	....	40.00	40.00	45.00	....	40.00	43.00	40.00	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	80.00*	....	....	70.00	70.00	80.00	....	60.00	65.00	70.00	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	100.00	....	....	100.00	95.00	120.00	....	90.00	100.00	95.00	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	70.00	70.00	....	....	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	50.00*	....	....	60.00	....	60.00	....	65.00	58.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	120.00	....	....	....	....	....	....	....	160.00	160.00	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	80.00*	....	....	70.00	70.00	75.00	....	75.00	73.00	80.00	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	55.00	....	....	60.00	58.00	65.00	....	55.00	58.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	40.00*	....	....	60.00	56.00	60.00	....	....	65.00	....	....	....
(62) Mouldings, Yellow Pine	over list	1.25	....	....	1.25*	....	1.00	....	....	1.10	1.00*	....	....
(63) Washington 16 in., 5/2 Clears	per M.	7.25	....	....	6.50	7.50	7.50	....	8.00	7.00	6.50	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	6.50	....	....	5.20	....	....	....	....	6.50	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	6.50*	....	....	7.50	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	6.50	....	....	6.00	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.- 10 in. 12 in., No. 1 Com. Yellow Pine Boards	per M.	46.00	....	....	....	60.00	60.00	....	60.00	60.00	....	....	....
ADDITIONAL ITEMS													
(68) Stucco, Cement	Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags	Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags	Per Bag.	....	....	....	....	....	.20	....	....	....	.25	....	....
(71) Wall Board (Please Note Kind)*	Per Sq. Ft.	.042	.04	....	....	.0425	.05	....	.04	.045	....	.05	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime (bulk, Item No. 1)—Reading, 80 lb. bu.; (Barreled, Item 2-3)—(2) Newark includes bbls., returned at 15c; (Item 3), finishing, returned bags, 10c; Philadelphia, per bu.; Paterson, 300 lbs.

Crushed Stone (4)—Pittsburgh, base 1 in.

Common Brick (Item 6)—Philadelphia. f. o. b. job. mfrs. retail price.

Flue Lining (Items No. 10, 11) Erie, (10) 8x8 in., (11) 8x12 in.

Fire Clay (Item 13)—Return bags, Elmira, 15c; Jamestown, none; Pittsburgh, paper sacks, $2.00 extra per ton, in cloth sacks. with no allowance for returned sacks. Scranton, returned sks., 25c; Paterson, per bag.

Gravel (Item No. 14)—Scranton, 2400 lb. yd.; Elmira, 2500 lb. yd.; 2000 lb. ton, Reading; Philadelphia, per ton; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Hollow Building Tile (Item 15-16)—Rochester, (Item 15) 4 cell; (Item 16) 6 cell.

Hair (19)—Lbs. per bu., Pittsburgh, Elmira, 4; Scranton, 7; price per lb., Erie; old stock, Rochester; Pittsburgh, fibre; Allentown Govt.; Paterson, per lb.

Plaster Board (Item 32) Paterson, price for each.

Sand (Item 34)—Elmira, 2600 lb. yd.; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60; Scranton, per ton.

Wall Plaster (Items 39, 40, 41)—Returned sacks, 15c, Jamestown, Allentown, Scranton, Pittsburgh, Philadelphia; 20c, Erie; Newark, 15c credit for returned sacks.

Wall Ties (Item 42)—Corrugated. Allentown, Elmira; per box, Pittsburgh.

Roofing, Slate Surf. (Item 45)—70 lbs., Elmira; 75 lbs., Rochester.

Roofing, Smooth Surf. (Item 46)—55 lbs., Elmira, Rochester.

Stucco Board (Item 47)—Rochester, Sheetrock.

(Item 49)—Newark, spruce; Allentown $11.50 to $12.50. **(Item 50)**—Elmira, 12 ft. to 14 ft., No. 2 Com. **(Item 52)**—Elmira, No. 2 Com. **(Item 54)**—Elmira, B. & Btr. **(Item 57)**—Elmira, No. 2. **(Item 59)**—Elmira, B. & Btr. **(Item 61)**—Elmira, fir; **(Item 62)**—Jamestown, per 1½ inches; Scranton, per 100 lin. ft., moulding count; **(Item 65)**—Elmira, 6/2 Star, per sq.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. MIDDLE AND SOUTHERN ATLANTIC STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Trenton, N. J.	Wilmington, Del.	Washington, D. C.	Baltimore, Md.	Norfolk, Va.	Richmond, Va.	Huntington, W. Va.	Fairmont, W. Va.	Wheeling	Atlanta, Ga.
(1) Bulk Lime	per cwt.	$0.60*	$0.79	$0.75	$ 0.51*	....	....	....	....	....	$1.80*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	*	2.70	2.50	2.25	$2.50	$2.15	$2.80	$2.50	$2.75	2.25
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	*	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	2.50	....	....	3.00	3.75	....	4.50	5.00	....
(5) Crushed Stone	per yd.	....	3.40	....	....	....	....	....	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	14.00	22.00	18.00	21.00*	16.00	20.00	18.00	27.00	21.00	12.35*
(7) Corner Bead, galvanized	per ft.	.06	.04	.04	.05	.05	.06	.07	.04	.05	.065
(9) Drain Tile, 6 in	per ft.	....	....	.11	.14	.12	.125	.12	.10	.09	.11
(10) Flue Lining, 8½ in. x 8½ in	per ft.	....	.36	.20	.30	.30	.30	.30	.27	.30	.45
(11) Flue Lining, 8½ in. x 13 in	per ft.	.58	.54	.30	.45	.45	.45	.45	.40	.45	.60
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	....	75.00	80.00	75.00	80.00	85.80	60.00	60.00	65.00	60.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	....	21.00	25.00*	18.00	20.00	20.00*	15.00*	14.00*	11.50*	20.00*
(14) Gravel, washed	per yd.	2.50*	2.80	2.75*	2.50	4.80	4.00	2.40	3.25	2.00*	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	210.00*	160.00	200.00	225.00*	....	....	200.00	210.00*	185.00	133.35
(16) Hollow Building Tile (8x5x12 in.)	per M.	....	85.00	100.00	....	....	....	85.00	75.00	65.00	76.00*
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.475	.45	.40	.375	20.00*	18.50*	21.00*	.375	.50	1.90*
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.65	.60	.57	.50	22.50*	23.50*	22.00*	.475	.50	2.75
(19) Hair	per bu.	.45	.42	.50	.50	.60	.50	.50	.12*	.75	1.00*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.38	.35	.28	.355	.30	.35	.38	.34	.35	.40
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	.37	.31	.43	.305*	....	.35*	35	....	.38	.345
(22) Mortar Color, red	per lb.	.04	.04	.06	.035	.05	.04	.0275	.0265	.035	.0225
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	130.00	110.00	125.00*	180.00	150.00	115.00	100.00	82.50	79.80
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.18	.19	.155	.18	....	.20	.17	....	....	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.20	2.85	2.60	2.87	3.50	3.15	3.20	2.50	2.50	3.45
(30) Extra charge for each cloth sk	per sk.	.10	.075	.10	.07	.075	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	65.00*	40.00	....	50.00	....	60.00	32.00*	....	....	....
(32) Plaster Board, ⅜ in. thick	Per M. sq. ft.	.30*	35.00	31.25	37.00	....	40.00	35.00	35.00	35.00	....
(33) Sand (Building)	per ton	2.00	2.05	1.60	....	2.00	2.75	....	3.00	2.20	....
(34) Sand (Building)	per yd.	....	2.55	2.10	....	2.50	3.00	2.25	....	....	1.85*
(35) Sewer Pipe, single strength, off list	per cent.	50%	40%	25%	50%	50%	50%	50%	55%	55%	51%
(36) Wall Coping, 9 in	per ft.	.20	.24	.24	.26	.22	.22	.20	.20	.20	.35
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	22.00	19.50	....	....	....	24.00	22.00*	....	19.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks	per ton	....	22.50	21.00*	20.25	22.50*	23.00*	24.00*	21.00*	21.00*	25.00*
(40) Wall Plaster, sanded, in cloth 100 lb. sks., inc. sks	per ton	....	20.00	23.00*	....	22.50*	23.00*	24.00*	....	16.00	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. sks., inc. sks	per ton	....	22.50	23.00*	....	22.50*	23.00*	24.00*	21.00*	21.00*	....
(42) Wall Ties, galvanized	per M.	4.50	5.00	5.00	5.00	5.00	5.00	3.50	3.50	5.00	3.75
(43) Wall Plugs	per M.	....	25.00	28.00	25.00	....	....	20.00	....	16.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	8.00†	8.50	6.00	5.70†	....	....	6.75*	7.00*	7.25*	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.25*	3.00	3.00†*	2.60**	....	....	3.00*	2.50†*	2.60**	2.75§
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.75†	2.80	2.90§*	2.65§	....	....	2.75§	3.00§*	2.80§*	2.70§
(47) Stucco Board, Medium wt	per M. sq. ft.	....	....	75.00	....	60.00	65.00	....	55.00*	45.00	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	65.00	68.00	....	....	....	....	....	....	....	....
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	13.50*	13.00*	8.50	13.00	8.00	6.00	10.50*	....	....	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	....	40.00	40.00	....	....	....	38.00	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	55.00	....	....	....	50.00	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	42.50	....	....	....	....	38.00	....	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	....	....	....	....	....	....	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	....	70.00	70.00	....	....	....	70.00	....	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	....	75.00	70.00	....	....	....	90.00	....	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	70.00	55.00	....	....	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	....	....	55.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	135.00	....	....	....	....	160.00	....	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	75.00	70.00	....	....	....	75.00	....	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	....	50.00	40.00	....	....	....	55.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	65.00	....	....	....	....	....	....	....	....
(62) Mouldings, Yellow Pine	over list	....	1.00	1.00	....	....	....	1.00	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	....	6.50*	....	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	7.50	....	....	....	....	8.00*	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	6.50	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in. 12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	....	....	....	....	58.50	....	....	....
ADDITIONAL ITEMS											
(68) Stucco, Cement	Per Sq. Yd.	....	....	....	....	....	....	....	52.00*	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags	Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags	Per Bag.	....	....	....	.25	....	....	....	.20	....	....
(71) Wall Board (Please Note Kind)*	Per Sq. Ft.	.0425	.04	.0385	.04	....	....	....	.04	.0375	.0375

*(Above item 49)—No lumber revisions received for this issue from this city.

Lime (bulk, Item No. 1)—Baltimore, per bu.; Atlanta, bbl. of 3 sacks; Trenton, 70 lb. bu. (Barreled) Trenton, not handled locally, supply from Philadelphia. **Hydrated** (Items 17, 18)—Ton lot price, Richmond, Norfolk, Huntington; Atlanta, barrel price.

Common Brick (6)—Baltimore, f. o. b. job, mfrs. ret. price. Atlanta, shale.

Fire Clay (13)—Washington, Atlanta, no credit for sacks; Wheeling, 15c credit for sacks; Fairmont, Huntington, 10c credit for sacks; bulk only, Richmond.

Gravel (14)—Ton price only. Trenton, Wheeling, Washington.

Hollow Bldg. Tile (Item 16)—Atlanta, shale, clay, $51.90; Trenton, Baltimore, Fairmont, load bearing.

Hair (19)—Bu. of 4 lb., Atlanta; Fairmont, per lb.

Metal Lath (Item 21)—Richmond, Baltimore, Gauge No. 27.

Partition Tile (26)—Baltimore, little demand.

Paving Block (31)—Huntington, culls; Trenton, known as paving brick.

Plaster Board (Item 32)—Trenton, price for each.

Sand (Items 33-34)—Atlanta, washed.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c credit, Washington, Wheeling, Huntington, Atlanta, Fairmont; sacks 14½c credit, Richmond; returned sacks, 10c, Norfolk.

Roofing, Slate Surf. (Item 45)—80 lb., Washington, Baltimore; 85 lb., Fairmont; Wheeling, 85 lbs.

Roofing, Smooth Surf. (Item 46)—55 lb., Washington, Fairmont; Wheeling, rolls, 55 lbs.

Stucco Board (Item 48)—Creosoted, Fairmont.

(Item 49)—Spruce, Trenton, Wilmington; Huntington, another quotes $9.00. **(Item 63)**—Huntington, Stars. **(Item 65)**—Huntington, XAXRC.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

Stucco, Magnesite (Item 69)—Fairmont, per ton.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. SOUTHERN AND SOUTHWESTERN STATES

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Miami, Fla.	Tampa★ Fla.	St. Petersburg	Louisville	Lexington	Memphis, Tenn.	Nashville, Tenn.	Birmingham,★ Ala.	New Orleans, La.	El Paso, Tex.	Houston
(1) Bulk Lime....per cwt.	....	....	....	$0.70	$0.93*	1.30*	$0.57*	....	$0.75	$0.625	$0.925*
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$3.00	2.25	$2.75	$2.35*	2.25	$2.00	2.35	....	1.88	2.00	2.75
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone....per ton	....	....	....	....	3.00	....	....	....	....	1.50	....
(5) Crushed Stone....per yd.	2.50	6.00*	5.75	....	....	2.50*	3.15	....	....	....	3.60
(6) Common Brick, standard quality and sizes (8x2¼x3¾) per M.	25.00	18.00*	17.00	18.00	18.00	14.50	15.00	....	14.57	16.00	17.00*
(7) Corner Bead, galvanized....per ft.	.06	.05	.07	.05	.06	.06	.05	....	.07	.05	.045
(9) Drain Tile, 6 in....per ft.	....	....	....	.084	.11	.09	.14	....	.12	....	.18
(10) Flue Lining, 8½ in x 8½ in....per ft.	.30	.40	.45	.27	.35	.34	.30	....	.30	....	.44
(11) Flue Lining, 8½ in. x 13 in....per ft.	.45	.50	.55	.405	.50	.51	.45	....	.42	....	.65
(12) Fire Brick, Standard 9-in. No. 1 clay....per M.	85.00	80.00*	70.00	70.00	60.00	62.00	63.00	....	56.40	90.00*	60.00
(13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	40.00*	20.00	40.00	15.00*	20.00	16.00*	23.00*	....	14.10	....	20.00*
(14) Gravel, washed....per yd.	....	....	....	....	3.25	3.25*	2.25	....	3.05	....	3.75
(15) Hollow Building Tile (8x12x12 in)....per M.	260.00	280.00	230.00	208.40	180.00	180.00	246.30*	....	220.00	240.00	211.00*
(16) Hollow Building Tile (8x5x12 in)....per M.	180.00	120.00	120.00	92.60	80.00*	90.00	109.50	....	....	90.00	95.00*
(17) Hydrated Lime (masons) in 50-lb. paper bags....per bag	.65	.50*	.75	.50	.70	.50	.50	....	.41	.60	.49*
(18) Hydrated Lime (finishing) in 50-lb. paper bags....per bag	.75	.75*	.80	.65	.70	.60	.65	....	.58	....	.49*
(19) Hair....per bu.	1.00	.75	.75	75	....	.60	.55	....	.56	....	85
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡...per yd.	.34*	.42	....	.45	.35	.31	.40	....	.38	.37	.361
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs....per yd.	.34*	.30*	....	....	.35	....	....	....	.38	.40*	....
(22) Mortar Color, red....per lb.	.05	.04	.04	.035	.03	02	.05	....	.05	.035*	.0325
(26) Partition Tile, Clay (4x12x12 in.)....per M.	....	....	150.00	104.20	96.00	120.00	123.20	....	131.60	120.00	130.00*
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	....	....	....	....	....	.165	....	....	....	.165
(29) Portland Cement, 4 sacks to bbl., (excluding sks.) per bbl.	4.12	3.10	3.60	2.70	3.40	3.18	3.90	....	3.31	3.50	3.15
(30) Extra charge for each cloth sk....per sk.	.07	.10	.05	.10	.10	.10	.10	....	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	....	....	....	....	....	....	....	....	40.40	....	....
(32) Plaster Board, ⅜ in. thick....per M. sq. ft.	55.00*	40.00*	41.00	50.00	55.00	47.50*	44.00	....	41.36	....	60.00
(33) Sand (Building)....per ton	....	....	1.00	....	3.30	....	....	....	....	1.50	....
(34) Sand (Building)....per yd.	1.50	3.50	1.40	....	3.96	2.17	3.00	....	1.88	1.75	1.50
(35) Sewer Pipe, single strength, off list.... per cent.	*	....	35%	55%	45%	....	50%	....	*	....	*
(36) Wall Coping, 9 in....per ft.	....	....	....	55%	45%	.23	.20	....	.16	....	.31
(38) Wall Plaster, neat, in paper, in 80-lb. bags....per ton	....	22.00	....	....	....	....	....	....	....	16.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. sks., inc. sks....per ton	....	24.00	25.50	25.00	24.00	24.00*	27.00	....	22.86	18.00*	25.00*
(40) Wall Plaster, sanded, in cloth, 100-lb., inc. sks....per ton	....	....	....	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloth, 100-lb., inc. sks....per ton	29.00*	24.00	25.50	25.00	....	24.00*	....	....	....	18.00*	....
(42) Nail Ties, galvanized....per M.	5.00	4.00	5.00	4.00*	4.50	4.50	5.00	....	4.75	4.00*	5.25*
(43) Wall Plugs....per M.	....	....	....	30.00	....	18.50	22.50	....	....	....	30.00
(44) Asphalt Shingle (*singles; †stripped)....per sq.	10.00	7.75*	8.25†	6.25	....	7.50*	7.65*	....	7.00	....	9.00
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	3.50**	3.00	3.50†	3.00†	4.00*	2.85†	3.00†*	....	3.00	4.00*	3.50**
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	....	3.25§	3.25§	3.25†	3.75§	2.85§	2.90§*	....	2.50	4.00§	3.50§*
(47) Stucco Board, Medium wt....per M. sq. ft.	....	50.00	....	60.00	....	....	....	....	....	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	....	....	....	....	....	....	....	....	....	....
LUMBER ITEMS					*		*				
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	11.00	10.00*	9.00*	....	5.50	7.50	8.50	....	7.00	12.00*	8.50*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	.....	32.00	....	....	35.00	.....	37.50	.....	34.00	45.00	40.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	.....	60.00	....	....	45.00	....	50.00	.....	52.00	48.50	45.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	.....	35.00	....	....	35.00	.....	35.00	.....	40.00	40.00	35.00
(53) 1x4 No. 2 Sheathing....per M. Board ft.	.....	30.00	....	....	30.00	.....	30.00	.....	30.00	.....	25.00
(54) 1x4 "B" Flooring....per M. Board ft.	.....	55.00	....	....	55.00	.....	50.00	.....	50.00	65.00	70.00
(55) Yellow Pine Clear Finish....per M. Board ft.	.....	80.00	....	....	80.00	.....	75.00	.....	65.00	90.00	75.00
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	.....	55.00	....	....	....	....	60.00	.....	67.00	....	60.00
(57) 1x6 No. 1 Common Drop Siding....per M Board. ft.	.....	45.00	....	....	....	.....	50.00	.....	47.00	50.00	50.00
(58) Cypress Finish Lumber....per M. Board ft.	......	150.00	....	....	150.00	.....	150.00	....	160.00	....	200.00
(59) ¾x4 "B" Partition....per M. Board ft.	.....	60.00	....	....	60.00	.....	55.00	.....	55.00*	70.00	75.00
(60) ½x4 "B" Ceiling....per M. Board ft.	.....	50.00	....	....	52.50	.....	50.00	.....	52.00	....	45.00*
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	.....	60.00	....	....	....	.....	65 00	....	....	....	45.00*
(62) Mouldings, Yellow Pine....over list	....	1.25	....	....	10%	....	10%	....	....	25%	*
(63) Washington 16 in., 5/2 Clears....per M.	....	....	....	....	5.50	7.50	6.50	....	....	....	7.50
(64) Washington 16 in., 5/2 Clears....per sq.	....	....	....	....	....	....	....	....	....	....	6.75
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Yellow Pine Boards...per M	.....	60.00*	....	....	....	.....	55.00	.....	56.00	55.00*	45.00*
ADDITIONAL ITEMS											
(68) Stucco, Cement....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	.43
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags...Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags....Per Bag.	....	....	....	.15	.13*	....	....	....	....	....	.15
(71) Wall Board (Please Note Kind)*....Per Sq. Ft.	.053	.045	....	.04	.055	.042	....	....	....	.05	.046

*(Above item 49)—No lumber revisions received for this issue from this city.

Lime (Item No. 1, bulk)—Nashville, 80 lb. bu. Lexington, 70 lbs.; Houston c/L f. o. b.; Memphis, f. o. b. cars. **Barreled Lime,** (Item 2 and 3), Louisville, blue river lime. **Hydrated** (Items 17, 18)—Tampa, 40 lb. bags, Florida lime; Houston, 40 lb. bags, **Crushed Stone** (Item 4-5)—Memphis, f. o. b. cars, per ton; Tampa, 1½ inch.

Common Brick (Item 6)—Tampa, Ala. and Ga. red; Houston, another quotes $21.00 L. C. L.

Fire Brick (Item 12)—Carload lots, El Paso; Tampa, $60.00 to $80.00.

Fire Clay (Item 13)—15c credit, Nashville; no credit, Louisville, Houston, Miami, Memphis.

Gravel (Item 14)—Memphis, concrete.

Hollow Building Tile (15, 16)—Houston, Interlocking tile, $117.00 per M; Lexington, f. o. b. cars; Nashville, load bearing; Houston, car loads.

Metal Lath (Item 20-21)—El Paso, Tampa, Gauge No. 27; Miami (21) Gauge 26, galvanized per sq. yd.; (Item 20)—Blk. Painted Exp. Key Lath, Gauge 27.

Mortar Color (Item 22)—El Paso, barreled lot price.

Partition Tile Clay (Items 25, 26)—Houston, mfrs. price.

Plaster Board (Item 32)—Miami, Memphis, ¼ inch; Tampa, ¼ inch, $35.00.

Sewer Pipe (Item 35)—Houston various per cent. off list; New Orleans, Miami, list.

Wall Plaster (38, 39, 40, 41)—15c sacks, El Paso, Memphis, Miami; Houston, gross ton, 15c sacks.

Wall Ties (42)—Corrugated, El Paso, Louisville, Houston.

Roofing, Slate Surf. (Item 45)—85 lbs. Miami, Nashville, Houston.

Roofing, Smooth Surf. (Item 46)—55 lbs., Nashville, Houston.

(Item 49)—Tampa, St. Petersburg, cypress; Houston, No. 1 Y. P., $7.50; No. 1 cyp. $10.00; El Paso, White Pine. **(Item 59)**—New Orleans, another quotes $60.00. **(Item 60)**—Houston, ⅝x4; **(Item 61)**—Houston, ½x6 clear Bevel Siding, Y. P. **(Item 62)**—Houston, list. **(Item 67)**—Houston, 12 inches, $60.00; 4 to 10 inches, $40.00; Tampa, $60.00 to $80.00 El Paso, price for 12 in. only.

Price and rebate on bags (Item 70)—Lexington, 8c on Cement; 13c on Plaster.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

SOUTHWESTERN AND CENTRAL STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Dallas, Tex.	Topeka, Kan.	Little Rock, Ark.	Okla. City Okla.	Cincinnati, O.	Cleveland	Columbus	Toledo	Detroit, Mich.	Evansville, Ind.
(1) Bulk Lime	per cwt.	....	....	....	$1.10	$0.95	$1.10	$0.45	$0.95	$0.85	$0.90
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$2.75	$3.00	$2.50	2.75	2.10	3.45	2.25	....	....	2.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	....	....	2.00*	3.10	2.90*	3.60	2.75*	3.25	2.60	....
(5) Crushed Stone	per yd.	....	....	....	....	....	4.50	...	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	20.00	....	12.50*	17.00	18.00*	14.00	16.50	17.00	16.85	14.00
(7) Corner Bead, galvanized	per ft.	.475	....	.06	06	.06	.04	.05	.04	.03	.04
(9) Drain Tile, 6 in	per ft.	.20	....	.15	.055*	.09	.076	.08	.082	.12	.045
(10) Flue Lining, 8½ in. x 8½ in	per ft.	.45	....	.55	.40	.24	65%*	.20	57%*	.27	.32
(11) Flue Lining, 8½ in. x 13 in	per ft.	.65	....	.70	.55	.36	65%*	.30	57%*	.405	.48
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	80.00	....	70.00	70.00	54.00	50.00	60.00	47.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	1.25*	....	25.00*	18.00	.73*	12.00*	.70*	11.00	10.00	15.00
(14) Gravel, washed	per yd.	....	....	....	3.10*	2 75*	....	1.25*	3.50*	3.00	1.60
(15) Hollow Building Tile (8x12x12 in.)	per M.	211.00	....	....	....	170.00	119.00	155.80	....	186.50	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	95.00*	....	....	90.00	68.00	50.00	....	75.00	79.00	65.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.50*	....	.625	.60	.45	.37	.35	.45	.40	.60
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.50*	....	.75	.60	.49	.40	.40	.45	.45	.60
(19) Hair	per bu.	.75	....	1.00	....	.55	.75	.65	.75	.20*	.60
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.362	.40	.42	.35	.35	.33	.36	.34	.34	.32
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	....	....	....	....	....	....	....	....	....	.28
(22) Mortar Color, red	per lb.	.09*	....	.03	.0275	.025	.0215	.025	.04	.03	.025
(26) Partition Tile, Clay (4x12x12 in.)	per M.	130.00*	....	....	....	100.00	60.00	79.90	80.00	97.70	75.00
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.1525	....	....	....	.18	.21	.15	.17	.185	....
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	3.20	3.00	3.60	3.80	3.08	2.64	2.85	3.08	3.00	2.80
(30) Extra charge for each cloth sk	per sk.	.10	.10	.10	.10	.10	.10	.10	.08	.07	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	....	....	....	....	45.00*	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	60.00	....	35.00	45.00	50.00	27.50	37.50	.30*	31.00	40.00
(33) Sand (Building)	per ton	....	....	....	2.20	2.25*	2.75	3.50	2.00	3.00	....
(34) Sand (Building)	per yd.	4.00	....	1.00*	....	2.30*	....	3.50	....	....	1.60
(35) Sewer Pipe, single strength, off list	per cent.	20%	....	....	....	55%	60%	60%	57%	50%	50%
(36) Wall Coping, 9 in.	per ft.	.30	....	.35	.37	.18	60%*	50%*	57%*	45%*	.22
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	....	....	18.00	21.75	18.00	17.00	....	18.75	....
(39) Wall Plaster, neat, in cloth, 100 lb. sacks, including sacks	per ton	21.00	21.00	27.00*	20.00	25.00	20.00*	....	....	19.00*	21.00
(40) Wall Plaster, sanded, in cloth, 100 lb., including sacks	per ton	....	....	....	....	....	11.50	16.00*	11.40*	13.00*	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb., including sacks	per ton	21.50	....	27.50*	20.50	25.00	20.00	....	14.00	19.00*	23.00
(42) Wall Ties galvanized	per M.	4.00	....	4.75	3.50	4.75	3.00	3.50	3.00	2.75	2.50
(43) Wall Plugs	per M.	27.50	....	25.00	30.00	....	....	....	20.00	....	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	8.50*	....	8.25*	7.00*	8.50*	5.75*	6.75†	6.50†	5.50†	5.60*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	4.00*	3.50†	3.25†	3.00†	....	2.85†	2.75†	3.00†	3.00**	2.60
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.50§	....	2.75§	2.50§	....	2.90§	2.10†	2.90§	2.40§*	2.40§*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	....	....	....	....	55.00	....	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	....	....	55.00	55.00	....	55.00	55.00	....
LUMBER ITEMS				*							
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	11.00*	10.00	9.00	....	8.75	13.00*	11.00*	12.50*	....	8.50*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	40.00	40.00	27.00	....	....	54.00	42.50	43.00	....	40.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	40.00	55.00	35.00	....	....	54.00*	....	....	....	50.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	35.00	40.00	27.00	....	....	47.00*	42.50	38.00	....	37.50
(53) 1x4 No. 2 Sheathing	per M. Board ft.	27.50	40.00	23.00	....	....	54.00	40.00	35.00	....	35.00
(54) 1x4 "B" Flooring	per M. Board ft.	70.00	55.00	45.00	....	....	93.00*	75.00	65.00	....	65.00
(55) Yellow Pine Clear Finish	per M. Board ft.	75.00	75.00	65.00	....	....	106.00	90.00	85.00	....	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	50.00	55.00	50.00	....	....	80.00	70.00	....	....	60.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	47.50	....	40.00	....	....	72.00	60.00	55.00	....	50.00
(58) Cypress Finish Lumber	per M. Board ft.	175.00	140.00	....	....	....	128.25	140.00	135.00	....	150.00
(59) ⅜x4 "B" Partition	per M. Board ft.	50.00	....	60.00	....	....	97.50	70.00	70.00*	....	75.00
(60) ½x4 "B" Ceiling	per M. Board ft.	....	45.00	35.00	....	....	66.25*	50.00	55.00	....	50.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	....	....	....	66.25	55.00	58.00	....	60.00
(62) Mouldings, Yellow Pine	over list	25%*	25%	15%	....	....	1.50*	1.10	25%	....	25%
(63) Washington 16 in., 5/2 Clears	per M.	7.00	....	....	....	....	7.95	7.50	7.00	....	6.75
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	5.50
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	50.00	55.00*	....	....	....	72.00	60.00	60.00	....	50.00
ADDITIONAL ITEMS											
(68) Stucco, Cement	Per Sq. Yd.	....	....	3.00	....	....	22.00*	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags	Per Sq. Yd.	....	....	....	....	....	....	....	1.50	....	....
(70) Price and Rebate on Bags	Per Bag.	....	....	....	....	.17	....	....	.15	....	.10
(71) Wall Board (Please Note Kind)*	Per Sq. Ft	.05	.05	.04	....	....	.0275	.045	.0425*	.035	.045

*(Above item 49)—No lumber revisions received for this issue from this city.

Lime, Hydrated (Item 17, 18)—Dallas, 40 lb. bags.

Crushed Stone (4)—Columbus, f. o. b. tipple stone at quarries; Cincinnati, bowlders; Little Rock, f. o. b. cars.

Common Brick (6)—Little Rock, Cincinnati, f. o. b. cars.

Drain Tile (Item 9)—Oklahoma City, 4-inch.

Flue Lining (10, 11)—Per cent. off list, Toledo, Cleveland

Fire Clay (Item 13)—Cincinnati, Cleveland, paper; Columbus, Dallas, price per sack, 10c; single sack rate, no credit on returned sacks, Little Rock.

Gravel (14)—Columbus, tipple, per ton; Cincinnati, Okla. City, per ton; Toledo, Roofing Gravel, per ton.

Hollow Building Tile (Item 15-16)—Dallas (Item 16), Interlocking Tile, $117.00 per M.

Hair (19)—Detroit, per lb.;

Mortar Colors (Item 22) Dallas, paste.

Partition Tile, Clay (26, 28)—Dallas, mfrs. price.

Paving Block (Item 31)—Toledo No. 2 quality.

Plaster Board (Item 32)—Per sheet, 32x36 ft., ⅜ in. thick, Toledo.

Sand (33, 34)—Cincinnati (33) concrete an (34) fine; Little Rock, f. o. b. yard.

Wall Coping (36, 37)—Per cent. off list, Toledo, Detroit, Columbus, Cleveland.

Wall Plaster (39, 40, 41)—Returned sacks, 15c, Cleveland, Little Rock; sacks, 12c each, Detroit; Columbus, 80 lb. paper; Toledo, 8c sacks.

Roofing, Slate Surf. (Item 45)—80 lbs. Detroit.

Roofing, Smooth Surf. (Item 46)—55 lbs., Detroit, Evansville.

(Item 49) — Cleveland, white pine; Evansville, pine; Columbus, chestnut; Dallas, cypress; Toledo, hemlock. (Item 51)—Cleveland, No. 2 Commercial; (Item 52)—Cleveland, No. 3; (Item 54)—Cleveland, No. 1 C.; (Item 59)—Toledo, Select Com. Cypress D4S; (Item 60)—Cleveland, ⅝ in.; (Item 62)—Cleveland, per 100 inches; Dallas, white pine; (Item 67)—Topeka, 12-inch, $65.00.

Stucco, Cement (Item 68)—Cleveland, per ton.

Wall Board; (Item 71)—Brand of Wall Board will be furnished upon request. Toledo, 3¾c to 4¼c depending on quantity bought.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

	INDIANA				ILLINOIS			
	Ft. Wayne††	Indianapolis	South Bend	Terre Haute	Bloomington, Ill.	Chicago	Moline★	Peoria
(1) Bulk Lime....per cwt.	$0.85	$0.83	$1.75	....	....	$0.65*	$0.80	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	....	....	3.25	....	$2.75	2.40	1.70	$2.75
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	....	....	....	....	....	....	....
(4) Crushed Stone....per ton	4.50	5.00	....	$3.00	4.00	....	....	....
(5) Crushed Stone....per yd.	....	5.63	....	....	....	2.75	3.75	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	18.00	18.50	20.00	17.00	20.00	....	18.00	14.50
(7) Corner Bead, galvanized....per ft.	.06	.05	.06	.06	.06	.04	.045	....
(9) Drain Tile, 6 in....per ft.	.07	.12	.04	....	.09	.10	.11	.12
(10) Flue Lining, 8½ in. x 8½ in....per ft.	.36	.65	.33	.30	.30	.24	.35	.40
(11) Flue Lining, 8½ in. x 13 in....per ft.	.54	1.00	.495	.40	.45	.36	.45	.50
(12) Fire Brick, Standard 9 in. No. 1 clay....per M.	70.00	65.00	55.00	60.00	75.00	70.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	13.00	10.50	15.00*	15.00*	20.00*	18.00*	12.00	9.00*
(14) Gravel, washed....per yd.	2.50	....	2.15	3.00*	4.45*	2.75	3.15	....
(15) Hollow Building Tile (8x12x12 in.)....per M.	....	157.75	205.00	....	....	127.00	135.00	90.00
(16) Hollow Building Tile (5x8x12 in.)....per M.	70.00	67.50	100.00	....	75.00	59.00	65.00	49.00
(17) Hydrated Lime (masons) in 50-lb. paper bags....per bag	.60	.42	.475	.50	.60‡	.45	.45	.50
(18) Hydrated Lime (finishing) in 50-lb. paper bags....per bag	.60	.50	.525	.55	.60‡	.50	.60	.57
(19) Hair....per bu.	.80	.60	.75	....	....	.50	.70	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡....per yd.	.44	.36	.37	.40	....	.31	.35	....
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs....per yd.	.42	....	.32	.30	.35	.29	.34	....
(22) Mortar Color, red....per lb.	.03	.03*	.05	.04	.05	.05*	.04	.03
(26) Partition Tile, Clay (4x12x12 in.)....per M.	....	95.00	100.00*	....	....	72.00	....	72.00
(27) Partition Tile, Gypsum (3x12x30 in.)....per ft.	....	.153	....	....	....	.115	.14	....
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.191	....	....	....	.14	.16	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)....per bbl.	3.20	3.40	3.00	2.75	2.80	2.20	2.60	3.00
(30) Extra charge for each cloth sk....per sk.	.10	.07	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	70.00	....	50.00	....	....	....	35.00	35.50*
(32) Plaster Board, ⅜-in. thick....per M. sq. ft.	50.00	40.00	35.00	35.00	35.00	30.00	40.00	50.00
(33) Sand (building)....per ton	3.00	5.00	....	....	3.50	....	....	....
(34) Sand (building)....per yd.	4.05	3.00	2.15	3.00*	4.00*	2.50	2.05	....
(35) Sewer Pipe, single strength, off list....per cent.	45%	45%	50%	60%	50%	60%	42%	32%
(36) Wall Coping, 9 in....per ft.	.26	.25	.22	60%*	.25	.16*	.25	.25
(38) Wall Plaster, neat, in paper, in 80-lb. bags....per ton	22.50	21.25	21.00	20.00	20.00	....	19.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. incl. sks....per ton	....	23.00‡	23.00‡	23.00	23.00*	18.00*	21.00	22.70
(40) Wall Plaster, sanded, in cloth, 100-lb. incl. sks....per ton	....	12.00‡	....	....	23.00	15.00	....	16.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb. incl. sks....per ton	23.75	22.50‡	23.00‡	23.00	23.00*	18.50*	22.00	22.70
(42) Wall Ties, galvanized....per M.	4.75	3.00	3.75	3.50	5.00	4.75	3.75	4.00
(43) Wall Plugs....per M.	30.00	25.00	25.00	....	10.00	23.00	23.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	7.50*	8.00	7.00†	7.50*	8.00*	6.75*	7.50	7.50*
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	3.00*	3.00*	3.00†	3.00*	3.75**	2.75	3.50*	3.25†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	2.55†	3.25§	2.75†	2.75§	3.50**	....	3.25§	2.75§
(47) Stucco Board, Medium wt....per M. sq. ft.	....	50.00	55.00	60.00	45.00	55.00	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	40.00	....	60.00	....	....	60.00	....	....
LUMBER ITEMS								
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	8.00	11.25	12.50	10.00	12.50*	....	12.00*	14.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	....	....	45.00	42.00	45.00	....	49.00	49.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	65.00	50.00	60.00	....	55.00	51.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	40.00	40.00	40.00	....	42.00	46.00
(53) 1x4 No. 2 Sheathing....per M. Board ft.	....	....	40.00	35.00	40.00	....	40.00	46.00
(54) 1x4 "B" Flooring....per M. Board ft.	....	....	65.00*	60.00	70.00	....	75.00	75.00
(55) Yellow Pine Clear Finish....per M. Board ft.	....	....	110.00*	80.00	85.00	....	....	90.00
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	60.00	....	....	75.00	68.00
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	....	....	60.00	50.00	65.00	....	50.00	....
(58) Cypress Finish Lumber....per M. Board ft.	....	....	150.00	....	125.00	....	140.00	150.00
(59) ¾x4 "B" Partition....per M. Board ft.	....	....	80.00	60.00	75.00	....	75.00	79.00
(60) ½x4 "B" Ceiling....per M. Board ft.	....	....	60.00	50.00	60.00	....	60.00	69.00
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	....	....	65.00	60.00	60.00	....	56.00	74.00
(62) Mouldings, Yellow Pine....over list	....	....	....	....	10%	....	*	25%
(63) Washington 16 in., 5/2 Clears....per M.	....	....	....	....	....	....	6.50	7.00
(64) Washington 16 in., 5/2 Clears....per sq.	....	....	6.50	5.00	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	6.75	....	7.50	....	6.50	7.00
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq	....	....	7.00	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards....per M.	....	....	60.00	55.00	60.00*	....	55.00	55.00
ADDITIONAL ITEMS								
(68) Stucco, Cement....Per Sq. Yd.	40.00*	....	....	....	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Including Bags....Per Sq. Yd.	55.00*	1.00*	1.05	....	....	....	....	....
(70) Price and Rebate on Bags....Per Bag.	.20	.15	.20	....	....	....	....	....
(71) Wall Board (Please Note Kind)*....Per Sq. Ft.	.045	.05	.06	....	.04	.045	....	.05

††Ft. Wayne—5% discount to contractors and manufacturers for payment on or before 10th of month following purchase, except shingles, roofing and common brick, on which regular 2% discount will be allowed.

*(Above Item 49)—No lumber revisions received for this issue from this city.

‡Means no cloth bags used.

Lime (bulk, Item 1)—Per bbl., 200 lb., Chicago.

Fire Clay (13)—Returned sacks 15c, South Bend, Bloomington; paper sacks, Chicago, Terre Haute; Peoria, bulk $7.80.

Gravel (14)—Terre Haute, 3000 lb yd.; Bloomington, 2500 lb. yd.

Mortar Color (22)—Indianapolis, Chicago, 100 lb. lots.

Partition Tile (Item 26)—South Bend, wagon load.

Paving Block (Item 31)—Peoria, 3x4x8½ in.

Sand (33, 34)—Terre Haute, 2600 lb. yd.; Bloomington, 2500 lb yd.

Wall Coping (36)—Per cent. off list, Terre Haute; Chicago, double slant.

Wall Plaster (38, 39, 40, 41)—Returned sacks, 15c, Bloomington, Chicago.

Roofing, Slate Surf. (Item 45)—85 lbs., Bloomington.

Roofing, Smooth Surf. (Item 46)—60 lbs., Bloomington.

(**Item 49**)—Peoria, Bloomington, Moline, cypress; (**Item 54**)—South Bend "B & Btr." (**Item 55**)—South Bend, Rough. (**Item 62**)—Moline, list; (**Item 67**)—Bloomington, 6 to 10 inches, 12 inches, $65.00.

Stucco, Cement (Item 68)—Ft. Wayne, per ton.

Stucco, Magnesite (Item 69)—Ft. Wayne, per ton; Indianapolis, not including dash.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News,* Chicago

BUILDING SUPPLIES LISTED. NORTH CENTRAL STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.
An asterisk (*) after a figure, refers to note below.
A star (★) after city name, denotes no revisions received.

Item	Unit	Green Bay, Wis.	Milwaukee	Minneapolis St. Paul★ Minn.	Davenport, Ia.	Des Moines	Sioux City	Kansas City Mo.	St. Louis, Mo.	Lincoln, †† Neb.	Denver, Colo.
(1) Bulk Lime	per cwt.	$2.00	$1.50	$1.70*	$2.00	....	$1.30*	$1.00	$0.70	....	$0.95*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	....	2.00	2.50*	3.50	$2.805	2.40	2.80	2.50	$2.60	2.95*
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	2.75	2.40*	....	....	4.50	4.50	....	2.30	3.50*	....
(5) Crushed Stone	per yd.	....	....	....	3.00	....	....	....	2.83	4.73*	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	14.00	18.00	18.00	17.50	20.00	19.50	22.00	17.00*	17.00*	14.00
(7) Corner Bead, galvanized	per ft.	.05	.05	.04	.035	.055	.045	.05	.035	.05	.05
(9) Drain Tile, 6 in.	per ft.	.08	.09	.09	.10	.10	....	.0625	.15	.10	....
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.27	.30	.32	.35	.385	.32*	.27	.27	.35	....
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.405	.40	.45	.50	.55	.48*	.40	.41	.55	....
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	55.00*	75.00	65.00	58.00	67.50	65.00*	55.00	41.00	57.50	35.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	15.00*	20.00	12.00	15.00	17.30*	20.00*	10.00	11.00	25.00	9.50
(14) Gravel, washed	per yd.	2.40*	2.25*	2.00	2.10	2.15*	3.50	4.50	2.15*	....	2.00
(15) Hollow Building Tile (8x12x12 in.)	per M.	170.00*	150.00	165.00	....	....	130.50	....	....	....	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	105.00	70.00	75.50	113.00	85.00	80.00	100.00	75.00	73.50	85.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.50	.50	.55	.60	.63	.75	.70	.50	.65	.55
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.75	.60	.65	.65	.73	.85	.76	.58	.65	.75
(19) Hair	per bu.	.75	.60	1.00	.75	.60	.75	.35	.65	.75	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs. ‡	per yd.	.30	.30	.32	.32	.39	.316	.35	.2933	.39	.3243
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	.28	.35*	.31	....	....	.2885*	.32*	.24	....	.3328*
(22) Mortar Color, red	per lb.	.05	.03	.035	.045*	.045	.03	.025	.2933	.035	.0495
(26) Partition Tile, Clay (4x12x12 in.)	per M.	120.00	85.00	85.00	....	150.00	90.00	140.00	97.00	....	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	*	.165	.1725	....	.17	.1275	....	.17	.165	.14
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	2.60	2.40	2.45	2.40	3.44	2.80	3.20	2.70	3.30	3.80
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(31) Paving Block, Vitrified (3½x4x8½ in.)	per M.	....	....	....	45.00	35.50	....	....	....	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	35.00	30.00	32.50	50.00	35.50	36.00	36.50	45.00	35.00	30.00
(33) Sand (Building)	per ton	2.40	2.00	....	....	1.35	2.20	....	2.05	2.00	1.60
(34) Sand (Building)	per yd.	2.00	2.00	....	1.25	1.35*	3.10	....	3.24	2.70	1.60
(35) Sewer Pipe, single strength, on list	per cent	55%*	55%*	....	....	....	40%	....	41%	23%	....
(36) Wall Coping, 9 in.	per ft.	.22	.25	.25	.25	.33	.27	.1875	.175	.35	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	19.00	....	....	....	20.80	17.00	....	22.00	18.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks.	per ton	20.00	21.00*	16.00*	21.00*	20.00*	20.00*	20.00*	24.00*	21.00	20.00
(40) Wall Plaster, sanded, in cloth, 100 lb., inc. sks.	per ton	20.00	14.50*	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloh, 100 lb., inc. sks.	per ton	20.00	21.00*	16.50*	....	21.00*	21.00*	....	21.00*	21.50*	....
(42) Wall Ties, galvanized	per M.	5.25	4.00	3.50	4.00	4.25	3.50	3.50	3.25	3.75	5.00
(43) Wall Plugs	per M.	....	....	....	16.50	31.00	20.00	....	....	20.00	25.00
(44) Asphalt Shingle (*singles, †stripped)	per sq.	6.60*	6.50†	6.50	8.00*	6.30†	8.00†	....	....	7.75**	10.00
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	2.75**	3.50†	3.25	3.25*	2.70	....	....	....	....	3.75*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.85§*	3.00§	2.75†	2.85†	2.48**	....	....	....	4.00§*	3.25*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	50.00	60.00*	55.00	45.00	....	....	....	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	55.00	60.00*	60.00	49.50	....	....	....	....	60.00

LUMBER ITEMS

Item	Unit	Green Bay, Wis.	Milwaukee	Minneapolis St. Paul★ Minn.	Davenport, Ia.	Des Moines	Sioux City	Kansas City Mo.	St. Louis, Mo.	Lincoln, †† Neb.	Denver, Colo.
			*		*						
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	10.00	10.00	11.50*	....	9.45*	10.00	8.50	....	9 00	11.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	35.00	....	47.00*	....	37.20	35.00*	44.50	....	40.00	34.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	101.00	55.00	48.60	35.00*	48.50	....	45.00	37.50
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	84.00	42.00	37.80	30.00	41.00	....	40.00	....
(53) 1x4 No. 2 Sheathing	yer M. Board ft.	....	....	71.00*	40.00	36.00	30.00	35.00	....	35.00	29.00
(54) 1x4 "B" Flooring	per M. Board ft.	....	....	82.00*	95.00	73*80	....	85.00	....	70.00	85.00
(55) Yellow Pine Clear Finish	per M. Board ft.	85.00	....	105.00	99.00	85.50	100.00	87.50	....	80.00	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	60.00	58.50*	50.00	65.00	....	55.00	47.50
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	47.00*	60.00	54.00*	....	60.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	125.00	....	....	....	126.00	....	120.00	....	125.00	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	....	59.00*	....	58.50	50.00	75.00	....	50.00	45.00
(60) ½x4 "B" Ceiling	per M. Board ft.	55.00	....	47.00*	....	49.50*	45.00	50.00	....	....	37.50
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	61.00*	....	54.00	55.00	52.50	....	60.00	62.50
(62) Mouldings, Yellow Pine	over list	60%	....	50.90	....	25%	*	*	....	....	15%
(63) Washington 16 in., 5/2 Clears	per M.	5.75	....	5.00*	....	6.75	6.50	6 50	....	5.50	4.75
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	7.25	6.50	....	....	....	....	....	6.00
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	6.75*	....	....	....	....	6.00
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	5.85*	....	....	....	....	6.00
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	92.00*	....	48.60	....	52.50*	....	45.00	33.00

ADDITIONAL ITEMS

Item	Unit	Green Bay, Wis.	Milwaukee	Minneapolis St. Paul★ Minn.	Davenport, Ia.	Des Moines	Sioux City	Kansas City Mo.	St. Louis, Mo.	Lincoln, †† Neb.	Denver, Colo.
(68) Stucco, Cement	Per Sq. Yd.	....	....	....	....	.85	....	....	....	1.50	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags	Per Sq. Yd.	....	2.25	....	....	.85	....	.60	1.20	....	....
(70) Price and Rebate on Bags	Per Bag.	....	.20	....	....	.15	.20	.20	.20	.15*	....
(71) Wall Board (Please Note Kind)*	Per Sq. Ft.	.045	.045	....	.045	.045	....	.045	.055	.055	....

*(Above item 49)—No lumber revisions received for this issue from this city.

††Lincoln, all prices less 5 per cent cash 10th of month.

Lime (Item No. 1, bulk)—Per 80 lb. bu., Denver, Sioux City, hydraulic; Minneapolis and St. Paul, per 180 lbs. (Barreled, Items 2, 3) Minneapolis and St. Paul, headed; Denver, 200 and 400 lbs.

Crushed Stone (4, 5)—Lincoln, 1 in. and chips; Milwaukee, net.

Common Brick (Item 6)—St. Louis, hard common. Lincoln, Nebr., price for 1st zone, $18.00 2nd zone.

Flue Lining (10, 11)—Sioux City, f. o. b. yard.

Fire Brick (12)—Sioux City, f. o. b. yard; Green Bay, high grade, 5c, Green Bay.

Gravel (14)—Des Moines, 3000 lb. yard; Milwaukee, St. Louis, Green Bay, per ton.

Hollow Building Tile (Items 15-16) Green Bay, another quotes $225.00.

Metal Lath (Item 20-21)—Milwaukee, Gauge No. 27; Denver, Kansas City, Gauge No. 26; Sioux City, Gauge 27, 2.3 lbs.

Mortar Color (22)—Davenport, discount in quantities.

Partition Tile (Item 28)—Green Bay, prices quoted at time of delivery.

Sand (34)—Des Moines, 3000 lb. yd.

Sewer Pipe (35) — Milwaukee 3x12 in.; Green Bay, 3 in. to 24 in. inc.

Paul, Davenport, Des Moines, Sioux City, St. Louis, Lincoln, Kansas City.

Asphalt Shingle (Item 44)—Lincoln, Standard wt.

Roofing, Slate Surf. (Item 45)—85 lbs., Green Bay.

Roofing, Smooth Surf. (Item 46)—60 lbs., Green Bay; 55 lbs., Des Moines, Lincoln.

Stucco Board (Items 48, 49)—Minneapolis and St. Paul, $55.00 to $60.00.

(Item 49)—Minneapolis and St. Paul, No. 2, mixed; Des Moines, No. 1 fir. (Item 50)—Minneapolis and St. Paul, Pine; Sioux City, Fir; (Item 51)—Sioux City, Fir; (Item 53)—Minneapolis and St. Paul, Pine; (Item 54)—Minneapolis and St. Paul, Fir; (Item 56)—Des Moines, No. 2 Clear Fir; Des Moines, No. 3 Clear Fir; (Item 59)—Minneapolis and St. Paul, No. 2 Clear Fir Joint; (Item 60)—Minneapolis and St. Paul, ⅝x4, No. 2 Clear Fir; Des Moines, No. 2 Clear Fir, 4 and 6 inches; (Item 61) — Minneapolis and St. Paul, Red Cedar. (Item 62)—Kansas City, Sioux City, list; (Item 63)—Minneapolis and St. Paul, 6 to 12 inches. Ex*A* Red Cedar; (Items 65 and 66)—Des Moines, Premium Shingle. (Item 67)—Minneapolis and St. Paul, 8 in., $96.00; 10-in., $101.00; 12-in., $106.00; Kansas City, 6 in. to 10 in., $42.50. 12 in. $53.50.

Price and rebate on bags (Item 69) Lincoln, Cement 10c, Plaster, 15c.

Wall Board (Item 71)—Brand of

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. **WESTERN AND PACIFIC STATES** **CANADA**

All prices are retail,

delivered-on-the-job, unless otherwise noted.
An asterisk (*) after a figure, refers to note below.
A star (★) after city name, denotes no revisions received.

Item	Butte, Mont.	Cheyenne, Wyo.	Los Angeles, Calif.	San Diego	San Francisco	Portland, Ore.	Seattle, Wash.	Winnipeg Man.	Toronto, Ont.	Halifax N. S.	Quebec★
(1) Bulk Lime....per cwt.	$0.90*	....	$1.00	$1.25	....	*	....	$0.58*	$0.825	$0.75	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	....	$3.50	2.75	2.[illegible]0*	2.65	$3.50	$3.75	3.55	....	3.40*	3.00
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	....	....	....	....	....	....	....	....	5.65*	....
(4) Crushed Stone....per ton	....	....	....	2.12	....	....	....	....	2.445*	.15*	2.50
(5) Crushed Stone....per yd.	....	1.75*	....	....	....	....	....	4.35	2.1875*	3.30	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)..per M.	21.00	22.00*	....	19.00	18.00	17.50	17.00*	19.00	18.00	20.00	16.50*
(7) Corner Bead, galvanized....per ft.	....	.05	.05	.06	.035	.05	.06	.04	....	.045	.05
(9) Drain Tile, 6 in....per ft.	....	....	.0975*	.14	.065	.08	.10*	.15	.11	....	.115
(10) Flue Lining, 8½ in. x 8½ in....per ft.	....	....	.3375	.50	.38	.45	.40	.55	.315	.35	....
(11) Flue Lining, 8½ in. x 13 in....per ft.	....	....	.4875	.72	.55	.65	.60	.75	.45	.55	....
(12) Fire Brick, Standard 9 in. No. 1 clay....per M.	80.00	.....	.....	70.00	70.00	85.00	80.00	85.00	80.00	90.00	74.50
(13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	20.00	25.00	12.50	30.00*	20.00	20.00	24.00	35.00	22.00	22.00*	22.50
(14) Gravel, washed....per yd.	3.00	....	....	2.78	1.25	1.35*	....	3.15	1.35	3.65*	1.75
(15) Hollow Building Tile (8x12x12 in.)....per M.	15.00*	....	....	235.00	....	180.00	....	280.00	....	....	....
(16) Hollow Building Tile (8x5x12 in)....per M.	15.00*	....	100.00*	120.00	112.00	95.00	110.00	105.00	....	....	....
(17) Hydrated Lime (masons) in 50 lb paper bags....per bag	1.25	.70*	1.00*	.85	1.10*	.6375	....	.60	.5563	.75	.67
(18) Hydrated Lime (finishing) in 50 lb. paper bags....per bag	....	....	.65	.90	....	.6375	24 00	.60	.5813	.80	....
(19) Hair....per bu.	.75	....	.60	.60*	....	....	....	1.00	2.50*	....	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs ‡....per yd.	....	.42	.35	.36	.3575	.40	.39	.315	....	.30	.30*
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs....per yd.	....	.38	.3175	....	.3175	.36	....	....	....	....	....
(22) Mortar Color, red....per lb.	.06	.07	.07	.05	.075	.09	.08	.09	.0275	.10	.10
(26) Partition Tile, Clay (4x12x12 in.)....per. M	....	....	103.00*	140.00	....	105.00	120.00	203.00	85.00	.20*	....
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	....	....	....	....	....	....	.165	....	....	....
(29) *Portland Cement, 4 sacks to bbl., (excluding sks.)..per bbl.	3.70	4.40	3.41*	3.92	3.35	3.45	3.65	4.00	4.20	4.40	4.28
(30) Extra charge for each cloth sk....per sk.	.10	.10	.15	.12	.15	.15	.05	.20	.20	.20	.20
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	....	....	....	55.00	....	60.00	48.00	....	....	....	....
(32) Plaster Board ⅜ in. thick....per M. sq. ft.	65.00	65.00*	....	50.00	....	50.00	.35*	51.00	35.00	37.50	46.00
(33) Sand (building)....per ton	....	....	....	1.63	....	1.35	....	....	1.40*	2.50	2.15
(34) Sand (building)....per yd.	2.50	1.50	....	....	....	1.35	1.50	3.15	3.50	3.75	....
(35) Sewer Pipe, single strength, off list....per cent.	....	....	....	10%	....	20%	....	.35*	40%	....	20%
(36) Wall Coping, 9 in....per ft.	....	....	....	....	....	....	.20	.35	.36	....	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags....per ton	....	22.00	....	....	....	....	....	24.50	18.50	19.00	28.00
(39) Wall Plaster, neat, in cloth, 100 lb. incl. sks....per ton	22.00	....	24.00*	26.00*	23.50*	22.00	23.00*	26.00*	22.50	22.00	....
(40) Wall Plaster, sanded, in cloth, 100 lb. incl. sks....per ton	....	....	....	....	....	....	....	....	14.00	....	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. incl. sks....per ton	21.00	....	....	....	....	....	23.00*	26.00*	12.50*	3.15*‡	....
(42) Wall Ties, galvanized....per M.	....	....	11.50	7.00	6.30	6.00	....	5.00*	....	7.00	4.00
(43) Wall Plugs....per M.	....	....	....	26.00	26.00	30.00	22.50	23.00	....	20.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	....	....	....	....	....	12.00	....	10.50	6.25*	10.50	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	....	....	3.50**	3.25†*	4.50**	3.25*	3.50**	5.10†*	3.25*	4.90†	3.90†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	....	3.75§	3.75§*	3.75§*	3.50§*	3.60§*	3.20§*	4.00§*	3.60§*	4.90§*	3.75§
(47) Stucco Board, Medium wt....per M. sq. ft.	....	....	....	....	46.00*	....	45.00	65.00	....	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	....	....	....	....	....	....	....	....	....	....
LUMBER ITEMS				†	*	†		†			
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	9.00*	12.00	15.00	12.50	10.00	5.50*	7.50	11.00*	....	8.00	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	30.00	35.00*	....	37.00	20.00*	20.00*	18.00*	....	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	45.00*	42.50*	....	44.00	55.00*	20.00	18.00*	....	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	35.00*	....	....	39.00	....	14.00*	14.00*	....	....	....	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	40.00	30.00*	....	29.00	25.00	11.00	13.00	....	....	....	....
(54) 1x4 "B" Flooring....per M. Board ft.	75.00*	55.00*	....	81.00	70.00	35.00*	45.00*	....	....	....	....
(55) Yellow Pine Clear Finish....per M. Board ft.	100.00	100.00	....	100.00	....	55.00*	70.00*	....	....	....	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	50.00	55.00	....	68.00	....	35.00*	40.00	....	....	....	....
57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	40.00	....	....	....	....	25.00	....	....	....	....	....
58) Cypress Finish Lumber....per M. Board ft.	....	....	....	....	....	....	....	....	....	....	....
(59) ¾x4 "B" Partition....per M. Board ft.	85.00	55.00	....	65.00	....	35.00*	40.00	....	....	....	....
(60) ½x4 "B" Ceiling....per M. Board ft.	50.00	45.00	....	59.00	....	....	38.00	....	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	50.00*	75.00	....	48.50	....	....	54.00*	....	....	....	....
(62) Mouldings, Yellow Pine....over list	*	....	....	....	....	25%	*	....	....	....	....
(63) Washington 16 in., 5/2 Clears....per M..	5.00	5.50	....	6.00*	4.40	3.50	4.50	....	....	....	....
(64) Washington 16 in., 5/2 Clears....per sq	4.00*	....	....	....	4.90	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow Pine Boards per M.	45.00	....	....	38.00	....	25.00*	18.00*	....	....	....	....
ADDITIONAL ITEMS											
(68) Stucco, Cement....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags....Per Bag.	....	....	....	....	....	....	....	....	....	....	....
(71) Wall Board (Please Note Kind)*....Per Sq. Ft.	.045	.05	....	.065	.0525	.05	.055	....	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) means no cloth bags used.

(†) above San Diego lbr. prices means all items are Oregon Pine.

(†) above Winnipeg lbr. prices means 15 per cent off.

(†) above Portland lbr. prices means all items are Fir.

Lime (Item No. 1, bulk)—Per 70 lb. bu., Winnipeg; Portland, price on dock. Butte, per bu. (**Barreled**, Items 2, 3), per 200 lb. bbls., San Diego; Halifax, 200 and 400 lbs. **Hydrated** (Items 17, 18) Ton rate, Portland; Portland, 15c Los Angeles, Tiger Brand; fine; San Francisco, per 80 lbs.; Cheyenne, 40 lb. paper bags.

Crushed Stone (Items 4, 5)—over. Halifax, per bu. Cheyenne, gravel & sand mixed.

Common Brick (Item 6)—Quebec, another quotes $16.00; Seattle, Cheyenne, f. o. b., Job.

Drain Tile (Item 9)—Seattle, clay; Los Angeles, f.o.b. factory, cartage extra.

Fire Clay (Item 13)—San Diego, returned sacks, 8c; 15c, Halifax.

Gravel (Item 14)—Portland, price on dock; Halifax, cu. yd.

Hollow Building Tile (Item 15, 16) — Los Angeles, 5½x8x11½ (Heath); Butte, per ton at yard.

Hair (19)—Rope fibre used in San Diego, per pkg.; Toronto, per 24 lb. bag.

Metal Lath (Item 21)—Quebec, galvanized.

Partition Tile, Clay (Item 26) —Per sq. ft., Halifax; Los Angeles, f.o.b. factory, cartage extra.

Plaster Board (Item 32)—Cheyenne, sheetrock; Seattle, per yd.

Sand (Item 33)—Toronto, car lots on track.

Sewer Pipe (Item 35)—Winnipeg, price for 4 in.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c, Winnipeg, San Francisco; sacks, 20c, Halifax; sacks, 12c, Los Angeles, San Diego; (Item 41), per bbl., Toronto, Seattle, including sks., 10c each.

Wall Ties (Item 42)—Winnipeg, corrugated.

Roofing Slate Surf. (Item 45)—Los Angeles, 80 lbs.; Seattle, San Francisco, 95 lbs.; San Diego, 55 lbs.; 80 lbs., Winnipeg.

Roofing Smooth Surf. (Item 46) —Toronto, Everlastic; Seattle, Los Angeles, San Diego, San

Stucco Board (Item 47)—San Francisco, button lath, ⅜ in. thick.

(**Item 49**)—Portland, fir: Butte, pine; Winnipeg, 15%. (**Items 50, 51, 52**)—Cheyenne, San Francisco, (50) fir; (51) Seattle, fir; Butte, San Francisco, No. 2; (52) Portland, Butte, No. 3 Shiplap; (**Item 53**)—Cheyenne, White Pine. (**Item 54**)—Portland, fir; Seattle, S. G. Fir; Cheyenne, $60.00 & $80.00 fir; Butte, V. G. Coast Fir. (**Item 55**)—Seattle, Portland, fir. (**Item 56**)—Portland, fir; (**Item 59**)—Portland, fir. (**Item 61**)—Seattle, cedar; Butte, cedar; (**Item 62**)—Seattle, Butte, list; (**Item 63**) San Diego, 16 in. *A* 6/2; (**Item 64**)—Butte, 6/2; (**Item 67**)—Portland, Seattle, fir.

Wall Board (Item 71)—Brand

Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

ASBESTOS PRODUCTS

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
Ambler Asbestos Shingles. Catalog. 5½ x 8½ in. 40 pp. Illustrated.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 36 pp. Illustrated. Standard Purlin Spacing Tables.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.
Engineers' Data Sheets. Catalog. 8½ x 11 in. 40 pp. Illustrated. Specifications and working sheets for Ambler Asbestos Corrugated Roofing and Siding.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Johns-Manville Asbestos Wood. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data. List of uses for asbestos wood.

BALANCES, SASH

Caldwell Mfg. Company, The, Rochester, N. Y.
Suggestion for the present-day Architect. Booklet. 6 x 9 in. 16 pp. Illustrated. Gives full-size dimensions and information for the purpose of writing specifications for Caldwell Sash Balances.

BOILERS—See Heating Equipment

BRICK

American Face Brick Association, 1151 Westminster Bldg., Chicago, Ill.
The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.
The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect. Price 50c.
A Manual of Face-Brick Construction. Booklet. 8½ x 11 in. Textbook on construction of the brick wall and various uses of face brick. 31 colored plates of brick houses with plans. Price, $1.00.

Common Brick Manufacturers Association of America, 1309 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available. Price $1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 72 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

BUILDING STONE—See Stone, Building

CAFETERIA EQUIPMENT

Albert Pick & Company, 208 West Randolph St., Chicago, Ill.
Equipment for Restaurants, Cafeterias and Lunch Rooms. (Book BH11.) 16¼ x 11 in. Illustrated. 86 pp. Shows practically everything required for the modern eating-place, with articles on the planning of cafeterias and other types of eating-places.
School Cafeterias. (Book BH131.) 16¼ x 11 in. 44 pp. Illustrated. Deals with the principle and practice of school feeding, including the co-ordination of domestic science room with the school eating-place. Numerous floor plans of representative installations.

CEMENT

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.
Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Pyrobar Gypsum Tile. Booklet. 8½ x 11 in. 32 pp. Illustrated. Details and specifications for fireproof partitions.
Bulletins, 8½ x 11 in., containing details and specifications for Pyrobar voids for use with reinforced concrete joist floor construction; Pyrobar roof tile; and monolithic gypsum floors and roofs.

DECORATIVE FABRICS

M. H. Rogers, Inc., 912 Broadway, New York, N. Y.
Samples of the following materials will be sent to architects upon request, to meet specific requirements:
Tapestries, velours, damasks, armures, cretonnes, tapestry panels, needlepoints, chair and sofa seats and backs.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.
Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.
Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

Truscon Steel Company, Youngstown, Ohio
Truscon Steel Windows. Catalog. 8½ x 11 in. 80 pp. Illustrated. Describing steel windows for industrial and commercial buildings.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Frink, I. P., Inc., 24th Street and 10th Avenue, New York, N. Y.
Catalog 415. 8½ x 11 in. 46 pp. Photographs and scaled cross sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

Kohler Co., Kohler, Wis.
Kohler Automatic Power and Light 110 Volt D. C. Booklet. 5 x 7 in. 32 pp. Illustrated. Describes a standard voltage automatic, electric power and light plant for isolated homes.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.
Simplex Manual Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Smyser-Royer Co., 1609 Sansom St., Philadelphia, Pa.
Exterior Lighting Fixtures. Catalog F. 8½ x 11½ in. Illustrated. Illustrates lamp standards, brackets, lanterns and pier lights, for exterior use.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 264. 8¼ x 10⅞ in. 54 pp. Illustrated. Gives description with diagrams of various types of motors, generators, generating sets, propeller fans, air heaters, and apparatus for special application.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.
Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.
Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, caged and bundled goods in factories, warehouses, terminal buildings, etc.
Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.
Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 130 West 34th St., New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs and brief descriptions.

Anchor Post Iron Works, 165 Broadway, New York, N. Y.
Catalog 51. 8½ x 11 in. 53 pp. Illustrated. Anchor Post Fences for Country Place, Factory or Farm.
Catalog 54. 8½ x 11 in. 24 pp. Illustrated. Factory Fences.

FIRE DOORS—See Doors, Windows and Trim, Metal

FIREPLACE EQUIPMENT

Covert Co., H. W., 137 E. 46th Street, New York, N. Y.
Hints on Fireplace Construction. Catalog. 5½ x 8½ in. 11 pp. Illustrated.
Diagrams of construction and installation of Covert "Improved" and "Old Style" Dampers and Smoke Chambers.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 64*

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
Armstrong's Cork Tile. Booklet. 5 x 7 in. 16 pp. Illustrated in color.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
Speaking of Floors. Booklet. 11¼ x 15 in. 16 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1921. Catalog. 3½ x 6 in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book. Three books. 3½ x 5¾ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.

Carter Bloxonend Flooring Co., 1303 R. A. Long Bldg., Kansas City, Mo.
Blox-on-end Flooring. Catalog. 3¼ x 6¼ in. 20 pp. Illustrated. Describing Blox-on-end Flooring and its adaptability to concrete, wood or steel construction; also various methods of installation.
Specification Sheet. 8½ x 11 in. 4 pp. Illustrated. Standard specifications in convenient form for architects and engineers as recommended by the American Institute of Architects.

CongoleumCompany, Inc. (Linoleum Dept.), Philadelphia, Pa.
"Specifications for Laying Linoleum and Cork Carpet, according to the Congoleum Company's new method compiled after years of careful research."
Linoleum Service Sheet. Gives complete printed specifications as well as detail drawings showing application in specific cases such as thresholds, staircases, under radiators, etc.
Installation and Care of Battleship Linoleum. Booklet. 6 x 9 in. 24 pp. Illustrated. Instructions as to the uses of Battleship Linoleum, its laying and care.
Pocket Pattern Book. Descriptive Booklet. 3½ x 8½ in. 64 pp. Illustrated. Shows full color reproductions of every grade and color of Linoleum, Inlaid Linoleum, Cork Carpet and also all patterns of the Gold-Seal Line.

The Marbleoid Co., 461 Eighth Ave., New York, N. Y.
The Universal Flooring for Modern Buildings. Booklet. 6¾ x 9¾ in. 32 pp. Illustrated. Describes uses and contains specifications for Marbleoid flooring, base, wainscoting, etc.
Marbleoid Flooring for Hospitals. Bulletin. 8½ x 11 in. 4 pp. Illustrated. Describes the especial features of this composition floor for hospital buildings.
Marbleoid Specifications. Booklet. 8½ x 11 in. 4 pp. Illustrated.

Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.
Modern Oak Floors. Booklet. 6⅛ x 9¼ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
Oak Flooring, How and When to Use it. Booklet. 3½ x 6¼ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thickness and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

General Chemical Company, The, 25 Broad Street, New York, N. Y.
Hard-N-Tyte for concrete and mortars. Booklet. 3½ x 8½ in. 8 pp. Illustrated. Describes use of Hard-N-Tyte as application for hardening concrete floors.
The Hard-n-tyte Specification. Booklet. 8½ x 11 in. 4 pp. Gives exact specifications for concrete floor finish.
Making poor concrete floors good and good ones better. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describes effects of Hard-n-tyte on concrete floors, with photographs and data.

Sonneborn Sons, Inc., L., 266 Pearl Street, New York.
Concrete and Lapidolith. Booklet. 5⅜ x 8⅜ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolize? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

FURNACES—See Heating Equipment

FURNITURE

Estey Organ Company, Brattleboro, Vt.
Pipe Organs. Complete specifications and full information furnished to the architect for pipe organ to be installed in any given residence, upon receipt of plans and other particulars.

Hampton Shops, 18 East 50th St., New York, N. Y.
Glimpses from Hampton Exhibits. Brochure. 16 pp. 5 x 7½ in. Illustrated. Shows examples of Hampton work and gives one an idea of their resources. Of interest to the client as well as to the architect.

Albert Pick & Company, 208 West Randolph St., Chicago, Ill.
Hotel, Apartment Hotel and Institution Installations. (Book BH120.) 16¼ x 11 in. Illustrated. 160 pp. Pictures and describes Hotel, Apartment Hotel, Club and Institution Installations with many photographs of representative establishments, showing equipment and furnishings in detail. Valuable to architects.
The "White" Door Bed and Space-Saving Devices. Booklet. 16¾ x 11 in. Illustrated. 34 pp. Consists almost exclusively of photographs, floor plans and diagrams, showing door beds, dressing cabinets, kitchen cabinets and other space-saving devices to increase rental values and augment living comfort.

GLASS CONSTRUCTION

King Construction Company, N. Tonawanda, N. Y.
Catalog No. 52. 9 x 11 in. 45 pp. Illustrated. Illustrating and describing greenhouses erected for private estates and public parks.

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3⅞ x 8½ in. 32 pp. Illustrated Covers the complete line.

GRANITE—See Stone, Building

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
Ball Bearing Butts. Booklet. B8. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 12F 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American District Steam Company, North Tonawanda, N. Y.
Bulletin No. 150-AF. 6 x 9 in. 32 pp. Illustrated. Describes the Adsco System of Atmospheric Steam Heating and explains how it saves 20 to 30% of fuel cost. Tells how to figure radiation.
Catalog No. 21-AF. 6 x 9 in. 200 pp. Illustrated. Lists and describes the full line of equipment and devices manufactured for use on underground and interior steam mains, expansion joints, steam meters, condensation meters, traps, flange fittings, angle fittings, manhole curbs, alignment guides, etc.

American Radiator Co., 816 South Michigan Avenue, Chicago, Ill.
Engineers' Data Book. 8 x 10¾ in. 48 pp. Illustrated. Valuable engineering data for estimating heating and ventilating requirements.
Ventilation for Vento Heaters. Catalog. 8 x 10¾ in. 24 pp. Illustrated. Examples of installation.

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam. Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Excelso Specialty Works, 119 Clinton St., Buffalo, N. Y.
Excelso Water Heater. Booklet. 12 pp. 3 x 6 in. Illustrated. Describing the new Excelso method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)

Kelsey Heating Company, James St., Syracuse, N. Y.
Booklet No. 5. 4 x 9 in. 32 pp. Illustrated. A dealers' booklet showing the Kelsey Warm Air Generator Method of warming and distributing air. Gives dimensions, heating capacities, weights, kind of coal recommended, and shows the mechanical and gravity system of heating homes, churches and schools.
Monroe Pipeless Booklet. 4½ x 8 in. 20 pp. Illustrated.
Monroe Tubular Heater. Booklet. 4½ x 8 in. 20 pp. Illustrated. General Booklet giving capacities, dimensions, weights, etc.
Syracuse Pipeless Booklet. 4½ x 8 in. 12 pp. Illustrated. General Booklet, giving sizes and capacities.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.

Minneapolis Heat Regulator Company, Minneapolis, Minn.
The Heart of the Heating Plant. Catalog. 6 x 9 in. 20 pp. Illustrated. Describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used

Page Boiler Company, The Wm. H., 141 West 36th Street, New York, N. Y.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions with specifications of the Volunteer Round and Monarch Square Sectional Boilers; also the Monarch Up-Draft and Down-Draft Smokeless Boiler; with method for apportioning size of boiler and radiation, and other heating data.

Smith Co., H. B., 57 Main Street, Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 230. 8¼ x 10⅞ in. 132 pp. Illustrated. Gives description and data tables of various types of heaters, also of steam traps.
Bulletin No. 227. 8⅜ x 10 11/16 in. 28 pp. Blue prints of heating and ventilating layouts in public buildings, factories, etc.
Catalog No. 1015. Book on Heating and Ventilating, complete with installations and diagrams.

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¼ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
Capitol Smokeless Type Boilers. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describing a new type of low-pressure heating boiler which burns soft coal without smoke.

Warren Webster & Co., Camden, N. J.
Webster Vacuum System of Steam Heating. Catalog. 8 x 10½ in. 36 pp. Illustrated. Describing the Webster Vacuum System of Steam Heating, its principles of operation, and advantages of installation.
Webster Feed-Water Heaters. Catalog. 8 x 10½ in. 28 pp. Illustrated. Describing the construction and operation of the Webster Feed-Water Heaters for steam-heating systems, power plants and industrial plants of every type.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 65*

HEAT REGULATORS—See Heating Equipment

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

INSULATION

Bishopric Mfg. Company, 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Business Noise, Its Cost and Prevention. Booklet. 6 x 9¼ in. 16 pp. Illustrated. Data on correction of acoustics in offices, theaters, churches, etc.
Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

JOISTS AND STUDS, PRESSED STEEL

Truscon Steel Company, Youngstown, Ohio
Truscon Structural Pressed Steel. Catalog. 8½ x 11 in. 24 pp. Illustrated. Information on Pressed Steel Beams and Joists for light occupancy buildings. Tables, specifications and views of installations.

LATH, METAL AND REINFORCING

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.
Truscon Steel Co., Youngstown, Ohio.
Hy-Rib and Metal Lath. 18th ed. Catalog. 8½ x 11 in. 64 pp. Illustrated. Gives properties of laths, specifications, special uses and views of installations.

LUMBER

California Redwood Assn., 206 Marvin Bldg., San Francisco, Calif.
California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated. Describes the use of Redwood Lumber for various places and conditions in the building of the home.
Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.
The Post Everlasting. Booklet. 10½ x 7½ in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.
Poles That Resist Decay. Booklet. 9¼ x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.
Morgan Millwork Organization, Chicago, Ill.
Building With Assurance. Book. 8½ x 11 in. 408 pp. Illustrated. Valuable to architects for the Standardized Mill Work illustrated and described.
Price Supplement. Catalog. 4 x 8 in. 96 pp. Illustrated. Prices all illustrations in "Building With Assurance" and is valuable in connection with it or by itself.
Pacific Lumber Company of Illinois, The, 1105 Lumber Exchange Bldg., Chicago.
Engineering Digest. Redwood Information Sheets. 1. General Data Sheet on Redwood, its Production and Uses. 2. Tanks and Vats for Water, Acid and Alkali Solutions and Oil. 3. Pipe for Water, Chemicals and Sewage Conveying. 6. Farm and Dairy Buildings and Equipment, Silos, Tanks, Pipe, Outbuildings, Irrigation Flumes, Drainage Boxes, Greenhouses, Etc. 9. Railroad Construction and Equipment. 10. Industrial Building Materials. 11. Residential Building Materials.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Brass Company, Waterbury, Conn.
Illustrated pamphlet describes the use and adaptability of extruded architectural shapes to meet the architect's design.
American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.
Rome Brass & Copper Company, Rome, N. Y.
Descriptive Price List. 5 x 7 in. A leather-covered loose-leaf book listing sheets, tubes, rods, rolls, anodes, strips, extruded shapes, angles and channels, tapered tubes and hose pipes; molding, door-rail; commutator bars and segments; electrical copper bar, rivets and burs.

METAL TRIM—See Doors, Windows and Trim, Metal

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6¼ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

OFFICE SUPPLIES

Dixon Crucible Co., Joseph, Pencil Dept., 224 J. Jersey City, N. J.
Finding Your Pencil. Booklet. 6¼ x 3¼ in. 16 pp. Illustrated.
The First Five. Booklet. 3½ x 5¼ in. 10 pp. Illustrated.
A Study in Sepia. Booklet. 7 x 4½ in. 5 pp. Illustrated.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Boston Varnish Co., Everett Station, Boston, Mass.
The Inviting Home. Booklet. 5½ x 9 in. 16 pp. Color Plates. A briefly worded book on painting for the busy architect or decorator.
Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.
Fox Co., M. Ewing, New York, N. Y.
Calcimines. Booklet. 3¼ x 6¼ in. 8 pp. Color cards.
S. C. Johnson & Son, Racine, Wis.
The Proper Treatment for Floors, Woodwork & Furniture. Booklet. 6¼ x 8¾ in. 32 pp. Illustrated in color. A treatise on finishing hard and soft wood in stained and enameled effects; also natural wood effects.
Portfolio of Wood Panels. 5½ x 10¾ in. 14 pp. A portfolio containing actual panels of finished woods. Also contains valuable information on finishing and re-finishing floors and woodwork.
National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book. 5½ x 3¼ in. 100 pp. Gives directions and formulas for painting various surfaces of wood, plaster, metal, etc., both interior and exterior.
Red Lead in Paste Form. Booklet. 6¼ x 3½ in. 16 pp. Illustrated. Directions and formulas for painting metals.
Came Lead. Booklet. 8¾ x 6 in. 12 pp. Illustrated. Describes various styles of lead cames.
Cinch Anchoring Specialties. Booklet. 6 x 3½ in. 20 pp. Illustrated. Describes complete line of expansion bolts.
O'Brien Varnish Co., 1121 Washington Avenue, South Bend, Ind.
That Magic Thing Called Color. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.
Architects' Specification Manual. 8½ x 11 in. 50 pp. Complete specifications for all paint products.
Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Preservative Coatings. Booklet. 6 x 9 in. 15 pp. Illustrated. Presents in a concise manner the properties and uses of the Standard Paint Company's various paint preparations.
Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.
Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.
Wadsworth-Howland Co., Inc., Boston, Mass.
Paints and Varnishes. Catalog. 5¾ x 8½ in. 140 pp. Illustrated. Covers the complete line.

PARTITIONS

Improved Office Partition Company, 25 Grant St., Elmhurst, L. I.
Telesco Partition. Catalog. 8½ x 11 in. 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.
Detailed Instructions for erecting Telesco Partitions. Booklet. 24 pp. 8½ x 11 in. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.
The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Folding Partitions. Booklet. 8½ x 11½ in. 16 pp. Illustrated. Covers the field of folding partitions for churches, schools, hotels, clubs and public institutions.
Rolling Partitions, Hygienic and Disappearing Door Wardrobes. Booklet. 6 x 9 in. 32 pp. Illustrated. Describes rolling partitions, particularly in churches and schools, and wardrobes as installed in schools and public institutions.

PIPE

American Brass Company, Waterbury, Conn.
Illustrated pamphlet giving tables of weights and price-lists devoted to Brass and Copper Pipe in iron pipe and plumbers' sizes.
Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.
National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.

PLUMBING EQUIPMENT

American Brass Company, Waterbury, Conn.
Benedict Nickel. Illustrated pamphlet descriptive of Benedict Nickel White Metal for high-grade plumbing fixtures.
Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.
Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 66*

PLUMBING EQUIPMENT — Continued

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.

Kohler Co., Kohler, Wis.
Kohler of Kohler. 5½ x 8 in. 48 pp. Illustrated catalog. Shows complete line of plumbing fixtures.

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Speakman Company, Wilmington, Del.
Speakman Showers and Fixtures. Catalog. 4½ x 7½ in. 250 pp. Illustrated. Catalog of Modern Showers and Brass Plumbing Fixtures, with drawings showing layouts, measurements, etc.
Toned Up In Ten Minutes. Booklet. 7½ x 10½ in. 16 pp. Illustrated. Modern Showers and Washups for Industrial Plants, showing the sanitary method of washing in running water.

Wolff Manufacturing Company, 255 No. Hoyne Ave., Chicago, Ill.
Plumbing Suggestions. Catalog. 3¼ x 6 in. 50 pp. Illustrated. Illustrating, describing and pricing Wolff Quality Plumbing Fixtures for residential installation.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10⅝ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

ROLLING DOORS AND SHUTTERS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Rolling Doors and Shutters—Steel and Wood. Catalog. 8½ x 11½ in. 80 pp. Illustrated. For engineers and architects. Covers all classes of heavy doors, for every purpose, and in great variety of materials, bronze, steel and wood. Many sheets of detail drawings.

ROOFING

American Brass Company, Waterbury, Conn.
Copper Products for Roofing Purposes. Illustrated price-list devoted to copper products, including sheets and rolls, for fabricating into leaders, gutters, flashings, shingles, etc.

Creo-Dipt Company, 1025 Oliver St., North Tonawanda, N. Y.
Architectural Service Sheets. 8½ x 11 in. Illustrated. Working drawings of construction, with standard specifications for design and construction of same.

Philip Carey Co., The, Cincinnati, Ohio.
Architects Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Illinois Zinc Company, 280 Broadway, New York, N. Y.
Pure Rolled Zinc. (Corrugated and Plain Sheets.) Booklet. 3½ x 6¼ in. 8 pp. Illustrated. Facts regarding adaptability of zinc for roofing. Specifications of corrugated zinc sheets. Weights per square. Comparative gauge lists.
The Roof That's Always New. Booklet. 3⅝ x 6 in. 12 pp. Illustrated. Story of Illinois Zinc Shingles, their everlasting and artistic qualities. Information regarding a complete zinc roof, shingles, starting piece, valley, ridge and hip piece.

Johns-Manville, Inc., Madison Avenue and 41st Street, New York.
Johns-Manville Colorblende Asbestos Shingles. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. 3½ x 6 in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Instructions for Laying Built-up Roofs. Booklet. 8½ x 11 in. Illustrated.
Roofing Facts Worth Knowing. Booklet. 6 x 9 in. 16 pp. Illustrated.

N. & G. Taylor Company, 300 Chestnut Street, Philadelphia, Pa.
Selling Arguments for Tin Roofing. Booklet. 6¼ x 9¼ in. 80 pp. Illustrated. Describes the various advantages of the use of high grade roofing tin, gives standard specifications, general instructions for the use of roofing tin, illustrates in detail methods of application.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHEATHING

Bishopric Mfg. Company, 103 Este Ave., Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

STANDARD BUILDINGS

Truscon Steel Co., Youngstown, Ohio.
Truscon Standard Buildings, 4th ed. Catalog. 8½ x 11 in. 40 pp. Illustrated. Erection details, cross-section diagrams and adaptations are given.

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Vol. 1. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 4. Indiana Limestone Bank Book. 6 x 9 in. 48 pp. Illustrated. Descriptive of the use of Indiana Limestone for bank buildings, with partial list of buildings in which it has been used.
Vol. 27. Designs for Houses of Indiana Limestone. 8½ x 11 in. 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review.*

STORE FRONTS

Kawneer Co., The, Niles, Mich
Kawneer Solid Copper Store Fronts. Catalog. "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
A Collection of Successful Designs. Catalog. 9¼ x 6½ in. 64 pp. Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

Zouri Drawn Metals Co., B. J. 10, Chicago Heights, Ill.
Architects' Catalog. 8¾ x 11¾ in. 86 pp. Illustrated. Showing a true copy of the approval of the Underwriters' Laboratories. Showing a proper glazing specification, based on the Underwriters' Report.
Catalog B. J. 8. 6 x 9 in. 68 pp. Illustrated. Key to Getting the People In.

STUCCO BASES

Bishopric Manufacturing Co., 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco board and Bishopric sheathing board.

STUCCO, MAGNESITE

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

TERRA COTTA

Atlantic Terra Cotta Co., 1170 Broadway, New York, N. Y.
Questions Answered. Booklet, 7½ x 5¼ in. 32 pp. Illustrated. A synopsis of questions most frequently asked by architects in relation to terra cotta, with brief but complete answers ; contains many illustrations.

National Terra Cotta Society, 1 Madison Avenue, New York, N. Y.
Standard Construction, Indexed, bound volume. 10½ x 16 in. 90 pp. 70 Illustrations. Standard forms of terra cotta construction with short article.
"The School." 10½ x 13½ in. 34 pp. 92 Illustrations. Types of school buildings with short descriptive articles. Volume I, brochure series.
"The Theatre." 10½ x 13½ in. 36 pp. 102 Illustrations. Types of theatre buildings with short descriptive articles. Volume II, brochure series.
"The Store." 10½ x 13½ in. 34 pp. 60 Illustrations. Types of store buildings with short descriptive articles. Volume III, brochure series.

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

THERMOSTATS—See Heating Equipment

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

Norton Company, Worcester, Mass.
Alundum Safety Tile. Booklet. 5 x 8 in. 15 pp. Illustrated. Description of material and its installation.
Tests of Alundum Tile. Booklet. 5 x 8 in. 18 pp. Illustrated. Describes its composition and proves its adaptability for its innumerable purposes.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 67*

Continued from page 67

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172. 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.
Fireproof Buildings of Natco Hollow Tile. Booklet 8½ x 11 in. 16 pp Illustrated. Showing the use of Natco Hollow Tile for private residences.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.

Gorton & Lidgerwood Company, 96 Liberty St., New York, N. Y.
Gorton Quarter-Turn Packing-Lock Valves. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Describing a new type of valve for all systems of steam, hot water and vacuum heating.

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates.
Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ in. 16 pp Illustrated.

Warren Webster & Co., Camden, N. J.
The Webster Type N Modulation Valves. Catalog. 8 x 10½ in. 8 pp. Illustrated. Describing a quick response, conveniently operated, and simple radiator supply valve.
The Webster Sylphon Trap. Booklet. 8 x 10½ in. 12 pp. Illustrated. Explaining the importance of the properly operating radiator return trap.

VENETIAN BLINDS AND AWNINGS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Booklet. 6 x 9 in. 32 pp. Illustrated. Describes the application of these light-regulating devices, with many photographic reproductions of homes, schools, hotels, clubs and institutions where these products are used.

VENTILATION

Globe Ventilator Co., Dept. P., Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.

WALL BOARDS

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Walls of Worth. Booklet. 8½ x 11 in. 24 pp. Illustrated. Describes Sheetrock, the fireproof wall board, its advantages and uses

WATERPROOFING

Ruberoid Co., The, 95 Madison Ave., N. Y.
Impervite. Circular. 8½ x 11 in. 4 pp. Illustrated. An integral waterproofing compound for concrete, stucco, cement, mortar, etc.

WATER SOFTENERS

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WINDOW HARDWARE

The Kawneer Company, Niles, Mich.
Kawneer Simplex Windows. Catalog. 8½ x 10½ in. 16 pp. Illustrated. Complete information, with measured details, of Kawneer Simplex Weightless Reversible Window Fixtures, made of solid bronze. Shows installations in residences and buildings of all sorts
Detail Sheets and Installation Instructions. Valuable for architects and builders.

Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¼ in. 24 pp. Illustrated. Covers complete line.

Smith & Egge Mfg. Co., The. Bridgeport, Conn.
Booklet. 6¾ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

WINDOWS, CASEMENT

Crittall Casement Window Co., 2703 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.

Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Architects' Portfolio. 8½ x 11 in. Loose-leaf. Large scale working details for mill-work and installation.
F. S. Details 20 x 23 in. and 15 x 22 in. Working details for mill-work and installation.
Hoffman Casements Catalogue. 7 x 8½ in. 16 pp. Illustrated.

Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

WOOD — *See* Lumber

THE ARCHITECTURAL FORUM

DECEMBER

1921

F. A.

gle Copy Sixty Cents ROGERS AND MANSON CO., PUBLISHERS Six Dollars the Year

THE ARCHITECTURAL FORUM

VOLUME XXXV NUMBER 6

CONTENTS for DECEMBER 1921

PLATE ILLUSTRATIONS

LETTERPRESS

ALBERT J. MacDONALD, Editor

Published Monthly by
ROGERS AND MANSON COMPANY
142 Berkeley Street, Boston 17, Mass.
Advertising Department, 103 Park Avenue, New York
Yearly Subscription, payable in advance, U.S.A., Insular Possessions and Cuba, $6.00
Canada.......................$6.75 Foreign Countries in the Postal Union, 7.50
Single Copies.............60 cents All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.

Albert J. MacDonald, Pres. and Treas., S. Howard Myers, Vice-pres., Robert Sweet, Sec.

THE EDITOR'S FORUM

RECORDS POINT TO CONTINUED BUILDING

WE are all hopeful that the close of this year sees the end of the depression which has so steadily affected the building industry, and we feel that there is ample justification for an optimistic outlook toward the immediate future because of the favorable conditions that manifested themselves in the fall months.

Contracts awarded in September proved that to be a record month in building statistics, not only for this year but for a period of ten years past. The activity thus started was maintained through October, when it is usual to expect a seasonal decline. The construction put under contract in October in the Northeastern states covered by the reports of the F. W. Dodge Co. amounted to $222,480,000, which is an increase of 25% over October, 1920, and but 10% under the total for September, the record month. Of this work, residential building leads with 40% of the total and business buildings constitute 17%, which is a very good showing for this class of work. A decided increase of activity was noted in industrial building during October, the figures amounting to $18,419,000, showing an increase of 63% over September for this type of construction. The contemplated new work reported in October was 24% greater than in September, which indicates a steadily growing interest in building that promises a substantial rate of activity during the winter months and a period of vigorous development in the spring.

AN EARLY AMERICAN RESTORATION

IN the early architecture of our country we have a heritage that we are recognizing as of more and more value as the years go on. Many of the old houses and civil buildings erected by the colonists have been permitted to fall into decay or have been utterly spoiled by the changes of later generations. By degrees some of the more important buildings are fortunately being restored by thoroughly capable architects, and this work is adding greatly to our fund of knowledge relating to the early builders and their methods.

It is of more than ordinary interest to find such a scholarly piece of restoration as that accomplished by Griffin & Wynkoop, architects, of New York in "York Hall," the home of Governor Nelson at Yorktown, Virginia. This building is of particular interest because of its Georgian character and the fact that its interior woodwork was in a sufficiently well preserved condition to enable the architects to carry out the new work in the exact spirit of the old, even to a very careful restoration of the original interior color schemes based on the English use of glazed colors so widely employed at the time.

GRAND PRIX MEN FOR PROFESSORS

TWO distinguished French architects, Albert Ferran and Jean Jacques Haffner, both of them winners of the *Grand Prix de Rome*, one of the highest honors to which architects aspire, have accepted invitations to this country to teach. M. Ferran will have charge of design at the Massachusetts Institute of Technology, where he will hold a professorship, while M. Haffner will be professor of design at the School of Architecture at Harvard.

Upon their arrival it was said that Boston will be the only place in the country where two *Grand Prix* winners are united in teaching architecture in schools which co-operate closely.

LE BRUN TRAVELING SCHOLARSHIP

THE program for the next Le Brun Traveling Scholarship Competition will be issued about January 1, 1922, calling for drawings to be delivered about March 1, 1922. Fourteen hundred dollars is awarded the winner to aid him in paying the expenses of a European trip.

Any architect or architectural draftsman, a citizen and resident of the United States, not under 23 or over 30 years of age, who shall for at least three years have been either engaged in active practice, or employed as an architectural draftsman and who is not and has not been the beneficiary of any other traveling scholarship, is eligible to compete.

Every competitor must be nominated by a member of the American Institute of Architects. Nomination blanks can be had of the Secretary of any Chapter, A. I. A., or of the Le Brun Scholarship Committee. Nominations should be sent so as to be received before January 1, 1922, to Le Brun Scholarship Committee, 215 West 57th street, New York, Julian Clarence Levi, Chairman.

ARCHITECTURE IN COMMERCIAL BUILDING

THIS quotation is from a paper by Walter W. Cook, Chief of the Architectural Department of Lockwood, Greene & Co., well known for their buildings in the textile and other industrial fields. It briefly sets forth an intelligent way of establishing a common ground of understanding between the architect and the business-man client.

"The architect must, to my mind, sit down with the owner and talk dollars and cents at the start and determine what the client is willing to spend for exterior treatment of his building—especially for a commercial building. At the same sitting, the architect must set forth the facts which are becoming more evident every day—that the proper treatment of any building is worth dollars and cents to a client for advertising value as well as for the morale of his business."

How We Start Right Right At The Start

Now, let me make that clear.

On the right start, right at the start, depends what you get when the job is done.

And the right start cannot be made without the right thought — can it?

Well, then, the starting thought with me is — the wood must be dry. If it isn't, your partition will crack and jeer at you, and down in the cellar she'll eventually go to feed the boiler.

What, then, makes for dry wood?

In the first place, it must be selected and collected a little at a time, by the mills, to meet our exacting standard.

There it is, car after car of it, piled in the air for three months at least.

That makes air-dry lumber.

Air-dry lumber, however, will not do for cabinet work.

During the war, to safeguard the lives of his aviators, Uncle Sam devised an intricate method of kiln-drying lumber for aeroplanes. We use exactly the same method but go him one better, for after another month in the kiln, the lumber is piled in the factory, which brings it to the moisture content of your office.

So, when I say Telesco Partition is dry before you get it, I mean just that.

It means that I do my part before it is ever manufactured, not after it is set up in your office.

So much for what I have to say about Telesco Partition.

Here is what the Farmers & Mechanics National Bank of Fort Worth say about a carload they have just used.

Henry Klein
President

> I enclose herewith our Draft for Eleven Thousand Four Hundred Forty Dollars, Eighty-Nine Cents ($11,440.89) in payment of carload of Telesco Partition shipped us.
>
> We are very proud of this partition work, and I frankly cannot see how the same could be improved upon very much.
>
> T. B. SEBASTIAN
> *Building Manager*

3-C

Our catalogue shows the complete construction

IMPROVED OFFICE PARTITION COMPANY

25 GRAND ST. ELMHURST, NEW YORK, N.Y.

DETAIL OF SGRAFFITO
PALAZZO DEL CONTE DI BOUTOURLINA, FLORENCE

The
ARCHITECTURAL
FORUM

VOLUME XXXV DECEMBER 1921 NUMBER 6

Sgraffito and Its Application

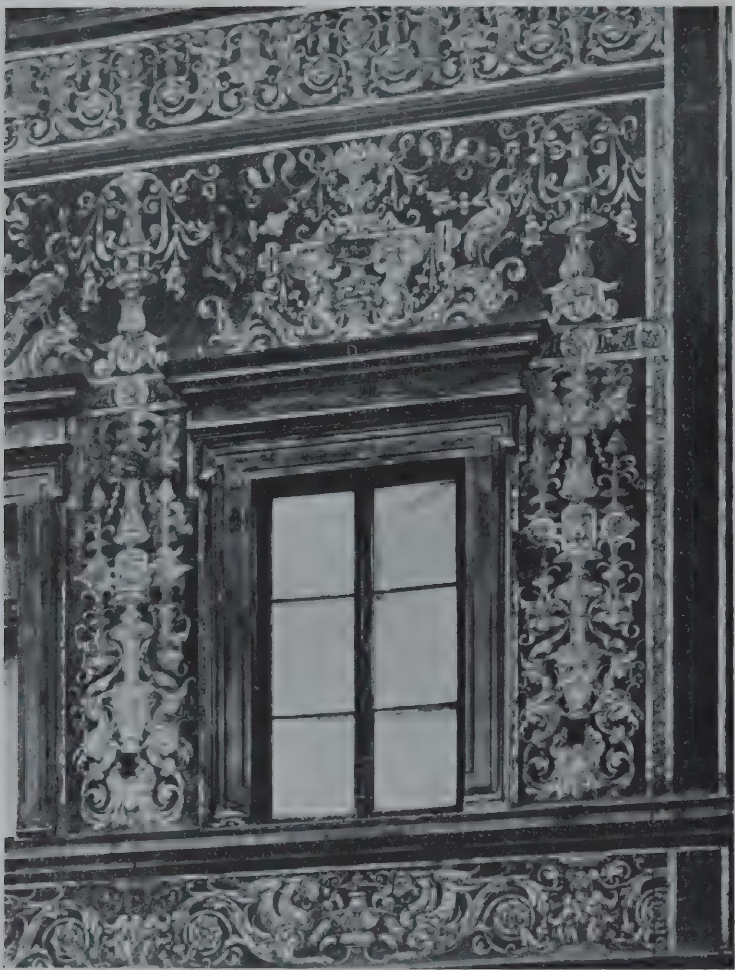
By MALCOLM RICE

THE application of sgraffito on plain surfaces, as a decorative art, has to a great degree been misunderstood by both artists and artisans in America. As stucco has played such an important part as a building material and its application is so well understood, it seems only reasonable to advance from plain stucco surfaces, when occasion permits, to the introduction of sgraffito. The same precautions are taken in good sgraffito work as are taken to insure permanent stucco.

The understanding of stucco by the Romans is attested by the well preserved examples that have come down to us and it is only natural that, when the artists of the renaissance went to Rome to study the classic, they should have absorbed some knowledge of its application. As sgraffito is an outgrowth and development of stucco, with the addition of a certain proportion of lime to make it plastic while working it, this work has assumed the permanency of Roman stucco, plus the half childlike but wholly experienced spirit and temper in drawing which blossomed with the renaissance.

The translation of the word "sgraffito," derived from the Italian word for scratch work, gives us the exact character of this work. It is a decorative art, scratched or etched with great cleverness of drawing, on plaster, using a metal point or scraper. The draftsman who attempts to design sgraffito must have a thorough knowledge of the technique of pen and ink drawing, and a good working knowledge of

Detail of Sgraffito Decoration, Palazzo Spinelli, Florence, Italy



Sgraffito Decoration, Second Story, Palazzo Sertini

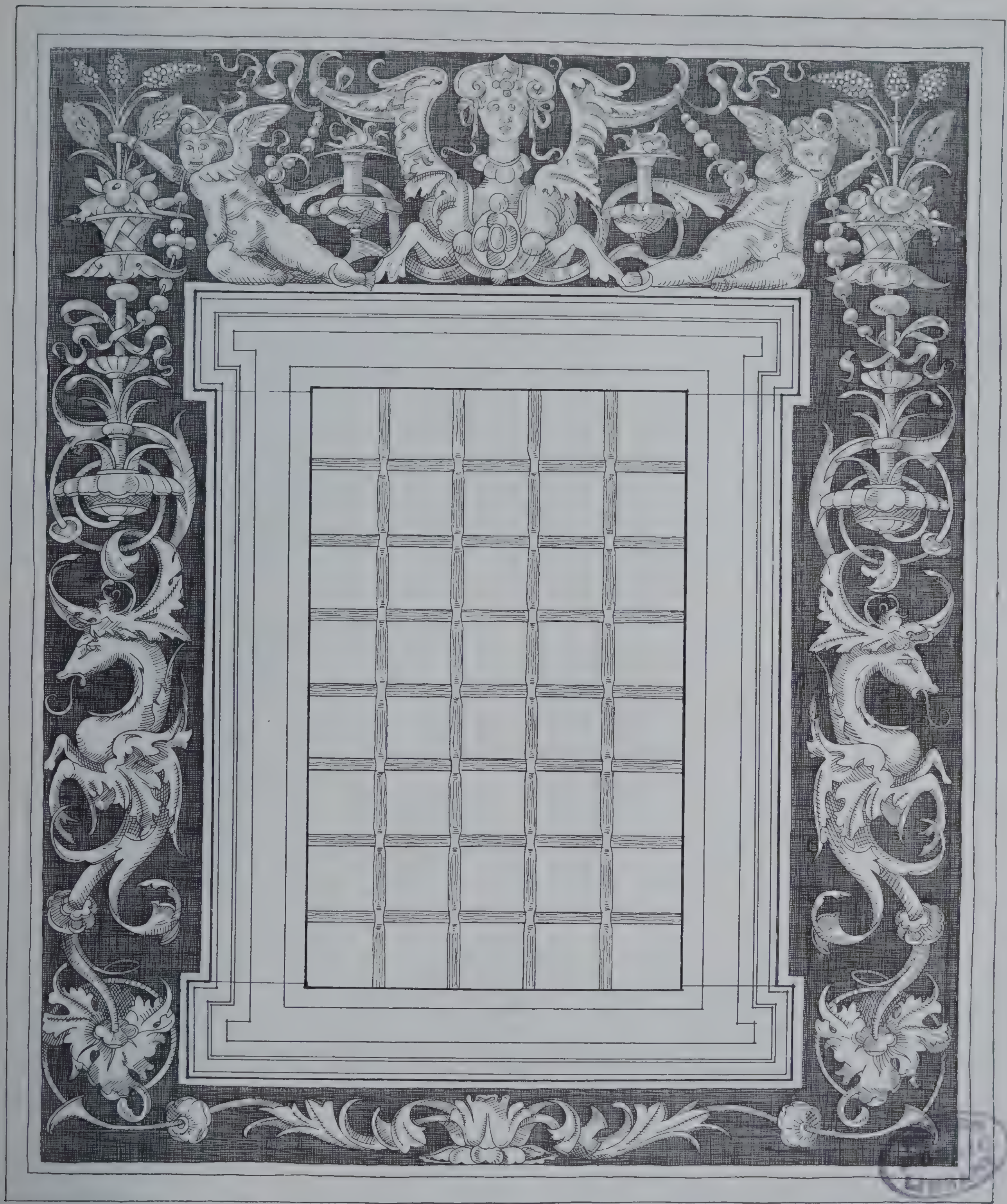
charcoal drawing. He must, in working up cartoons, which in all cases are full size, carefully consider a pleasing distribution of openings and solids. It is also necessary to have an appreciation of scale in the relation of subjects composing the cartoons.

In developing the cartoons it is well to make studies at the scale with which the draftsman is most successful in securing the relative values of light and dark. These studies should be carried to quite a finished stage before making full sized cartoons. It is noticed in the best examples, such as the Palazzo Sertini, Palazzo del Conte di Boutourlina and others, that there is a predominance of the light relief over the dark field. The subjects used in the design are unlimited, as will be observed by careful study of such examples as still remain. The artist has thrown restraint to the winds and satisfied all his sense of humor, pathos and satire in giving to this work a festive air, rendered in his most exquisite drawing. The design of sgraffito, to be successful, cannot be approached in a light or frivolous manner as the success of the work completely depends on the care, study and excellence of drawing on the full sized cartoons. In making these cartoons full size, they should be freely worked up in charcoal. Strength, simplicity, swing and directness are always the qualities striven for, the modeling being derived from lines, not blending. The final working drawings should be made on heavy detail paper and in hard, bold lines clearly showing the exact outlines.

Before applying the full-size drawings to the prepared plaster wall, the outlines of the design are perforated and sandpapered on the opposite side to prevent holes from becoming clogged when applied to the plaster. The detail is then put in place and the impression on the plaster obtained by pouncing through with a muslin bag filled with charcoal. Before the plaster, on which these cartoons are to be stenciled, is applied, the wall must be well tapped, sounded and calked. It is also well to soak the wall with water to prevent suction, but care must be taken not to get it too wet as it pre-

Sgraffito Decoration over Main Entrance, Palazzo Sertini, Florence, Italy

Executed by A. Feltrini, 1510. Measured and drawn by Malcolm Rice



SGRAFFITO DECORATION
AROUND WINDOWS OF FIRST STORY
PALAZZO SERTINI, FLORENCE, ITALY
EXECUTED BY A. FELTRINI, 1510
MEASURED AND DRAWN BY MALCOLM RICE

Detail of Sgraffito Decoration, Palazzo Rasponi, Florence, Italy

vents the plaster from drying quickly and evenly.

In the preparation of the plaster and the proportion of sand, cement and coloring matter used, it is impossible to give a uniform specification, as the climate, atmosphere and barometric conditions control the retarding or hastening of the setting of the plaster. It is necessary to make several samples of cement plaster, varying in mixture, before commencing work. The first coat is a strong concrete mixture, applied several days before the coats used for decoration, and left with a rough surface. It is made up of a 1 : 2 mixture of high grade Portland cement and clean, sharp sand, not too quickly setting. The second coat consists of marble dust, cement and whatever color may be desired. This coat should be applied before the first has completely dried, but after it has obtained its initial set. It is from $\frac{1}{8}$ to $\frac{1}{4}$ inch in thickness and perfectly applied.

The third coat consists of lime, fine marble dust, cement and whatever color is desired. It is mixed in a liquid form and applied with a soft brush before the second coat has set, to take the decoration. The total thickness of the coats is from $\frac{3}{4}$ inch to one inch. In the use of lime to prevent plaster from setting too quickly, care must be taken in the quan-

A Study in Sgraffito by Malcolm Rice

tity used, as too much is apt to cause hair cracks to appear in the finished work. This can be to a great extent overcome by using newspapers or blotting paper, well soaked with water, applied to the plaster. It is possible to model the surface in greater relief, as in the third story windows of the Alexander Building, New York, designed by Carrere & Hastings, architects, to accentuate certain architectural features in design. Care must be taken not to begin more work than can be finished in one day's work.

Sgraffito Decoration, Third Story, Alexander Building, New York
Carrere & Hastings, Architects

Complication in color should be avoided, although it is possible to introduce as many as three or four colors. Earth pigments give the best results, colors which are always reliable being ochres, umbers, Turkey red, Indian red and lime blue. These colors may be mixed to give any shade desired. Many colors may also be gained in the use of marble dust. If black or depth of tone is desired, charcoal, burnt straw or burnt paper is used. Brick dust has been used but with small success, as it is absorbent and the color soon fades. When blue is used in the color coat, it is likely to set more quickly and in drying a film of saltpeter develops. This may be removed with a stiff brush and a damp rag. A craftsman who is an authority on sgraffito believes the essentials of this work are clean, sharp sand properly graded in size, high grade Portland cement and the best qualities of raw materials. Particular stress should be laid on the length of time elapsing between coats.

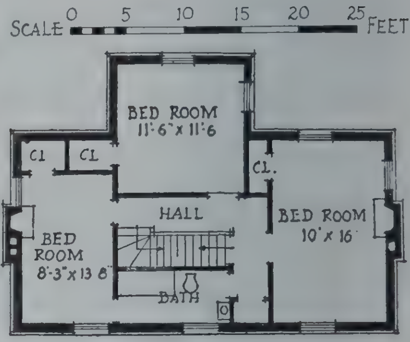
Sgraffito lends itself to broad architectural surfaces and was regarded by the late Stanford White as "the missing link in architectural design." It will adapt itself to loggias, vaulted ceilings, courts and patios. Outside of these forms, with appropriate subjects in the design, it can be made invaluable in garden and landscape work, as decoration at the end of vistas, and points of interest to be accentuated by spots of color. It is purely a decorative art and should be considered as having the same relation to exteriors that rugs, tapestries and murals sustain to interiors. Sgraffito is a direct medium of supplying the much desired and much needed color to our formal, informal and rural buildings in America.

Sgraffito Decoration on Frieze of Booth Theater, New York
Henry B. Herts, Architect

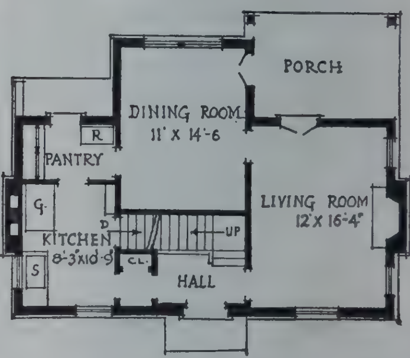
A Small Brick House, Moorehead, Minn.

OLAF WILLIAM SHELGREN, ARCHITECT

VIEW FROM STREET



SECOND FLOOR PLAN



FIRST FLOOR PLAN

VIEW FROM REAR GARDEN

MANY competitions for small house designs have been held, but illustrations of houses actually built from such designs are rarely seen. To those who have wondered what a competition house would look like in execution, we direct attention to these illustrations.

This design as presented in the sketch above was awarded first prize in the competition conducted by THE ARCHITECTURAL FORUM *in 1919 under the patronage of the American Face Brick Association. It was built in 1920 at a cost of $14,000. The design has been carefully followed in practically all essential details, but the absence of the decorative brick panel over the entrance is noticeable because it served a necessary purpose in giving emphasis to the doorway which the completed building lacks.*

Restoration of a Southern Colonial Estate

"YORK HALL," THE RESIDENCE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS

YORK HALL is one of the many old estates in Virginia in which are plainly reflected the fashions in architecture and decoration which were current in England during the eighteenth century. Its very location may have presupposed a certain degree of excellence, for Yorktown was built by order of the crown, from a plan evidently prepared in England, as a port of entry for all the British colonies in America. Captains of vessels bound for any of the ports along the American coast were obliged to clear at Yorktown before proceeding upon their way, and in what must have been an outpost of royalty the house of a prominent citizen would naturally be built with a con-

View of "York Hall" before Restoration Looking into Forecourt

Plot Plan of "York Hall"
Charles F. Gillette, Landscape Architect

siderable degree of architectural merit and finish.

This old estate, with its house built in 1740, was at the time of the revolution the home of Thomas Nelson, Jr., patriot, soldier and statesman, who was one of the signers of the Declaration of Independence and also Governor of Virginia—honors which involved the sacrifice of his entire personal fortune upon the altar of patriotism. Governor Nelson's home was used as the headquarters of Lord Cornwallis during the siege of Yorktown which was conducted by troops from all of the 13 original states and by the French under Lafayette. The scars which war left upon the Hall are not only those received during the revolution, for in the civil war Yorktown figured in McClellan's peninsular campaign against Johnson and Magruder, and later in the war the Nelson house was used as a hospital by the union army. At this period of its existence circular holes were cut in the door panels to enable the nurses to supervise the wards and traces of these may be seen in some of these illustrations. Like many other old southern homes York Hall fell into semi-ruin and decay until it was purchased and restored by Captain George P. Blow, whose home it now is. The restoration has been carried out with the utmost care to preserve the eighteenth century character of the house; parts which it was necessary to restore were studied from other parts still in place and woodwork was worked by hand to agree with that originally used.

Although it was possessed of ample grounds the original owner elected to place the Hall so that one end should be close to the side street, with a small forecourt in front of the house which formed the principal approach from the main street. The building itself is a solid, substantial pile of markedly English lines, such as were favored by prosperous citizens in Virginia, Maryland or lower Delaware, of brick with keystones at the windows and quoins at the corners cut from stone, a string course of brick surrounding the house between the lower and upper stories, and with a heavy dentiled cornice around the house and up the gable slopes. The brick used were probably brought as ballast from the kilns of England or Holland and are larger than modern brick—9 inches long, $4\frac{1}{2}$ inches wide and $2\frac{5}{8}$ inches thick, of a dull, brownish red approaching rose color, and laid in Flemish bond. The headers are of a dark, dull blue glazed brick with the red body showing through the glaze, and gray mortar is used in joints $\frac{1}{8}$ inch wide. A smaller brick of smoother texture and laid with narrower joints is used about doors and windows and for the brick pilasters at the main entrance.

View from Main Road Showing Old Box Hedge

In its plan the house adheres to the arrangement customary in the homes of substantial colonists of the period; a

Elliptical Forecourt at North Side of "York Hall"

wide hallway extends through the house, giving access to four square rooms on each floor. The hall contains the stairway, planned with two landings, which was restored from a few remaining balusters and a section of handrail, together with the mortise holes in the old treads. The importance attached to a large central hallway in the southern colonies was undoubtedly responsible for the compromise between plan and elevation. The house is not as large as the first impression of the illustration would lead one to believe; its dimensions are 56 feet across the front and 40 feet deep. This is due undoubtedly to the extremely large scale employed in the design. There is a consistency in the scale throughout and the very happy relation of parts produces a domestic effect in spite of the boldness of execution. The same vigorous handling is noted in the interior, the first floor rooms are 12 feet high and the windows, which are given vertical prominence by the use of pilasters or special paneling, are 7 feet high. The interior doors on the other hand are only 7 feet high, which tends to emphasize the largeness of scale.

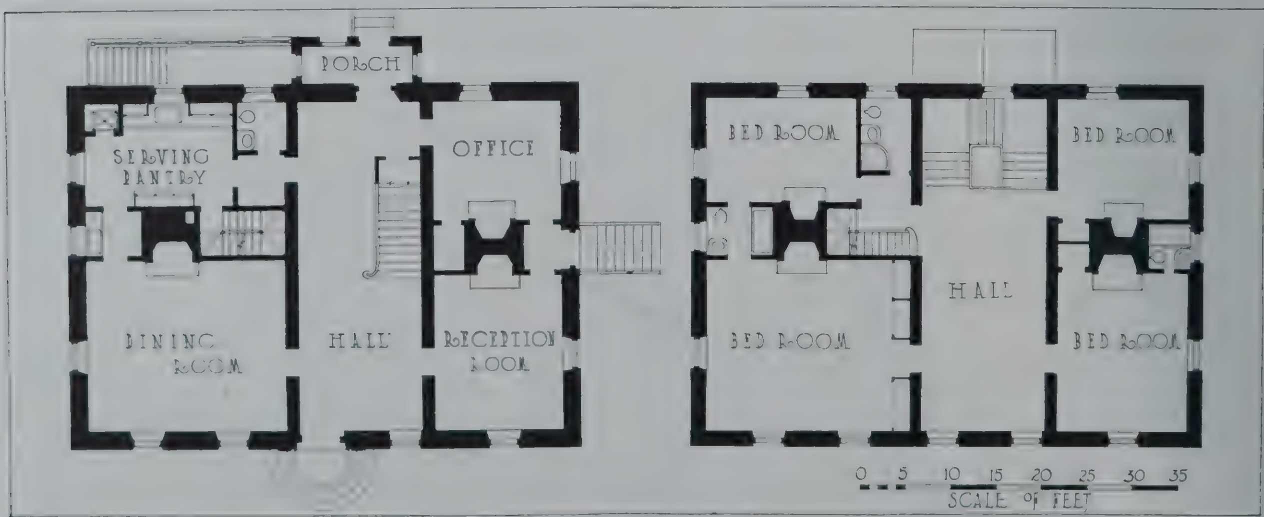
Practically all of the rooms are paneled in wood from floor to ceiling. The only exception for a principal room is the second floor hall where the paneling occurs only at the ends, the side walls being of plaster. There is a remarkable dignity about this old paneling and it can be ascribed to the pleasing proportions of the wall divisions and the extreme simplicity of the mouldings. The typical panel mould is a simple, flat quarter round made a part of the rails and stiles, and the panels themselves have their edges beveled to give them prominence. In the dining room is found the only exception; here the raised portion of the panel has a bead surrounding it and the panel mould consists of a small ovolo and bead. One detail worthy of notice is the entire absence of sharp external angles; wherever such angles occur they are finished with a bead. This is employed even on the edges of pilasters and the effect is particularly pleasing. Another individual detail is the use of a heavy moulding resembling a label mould over some of the windows and placed just below the room cornice.

The interior trim of York Hall affords an interesting study of the colonial following of the Georgian style which prevailed in America. Mouldings throughout were necessarily worked by hand and show many departures from the strictly accurate form to which we are accustomed; much of the interest of this interior woodwork lies in the slight changes at various points necessary to make

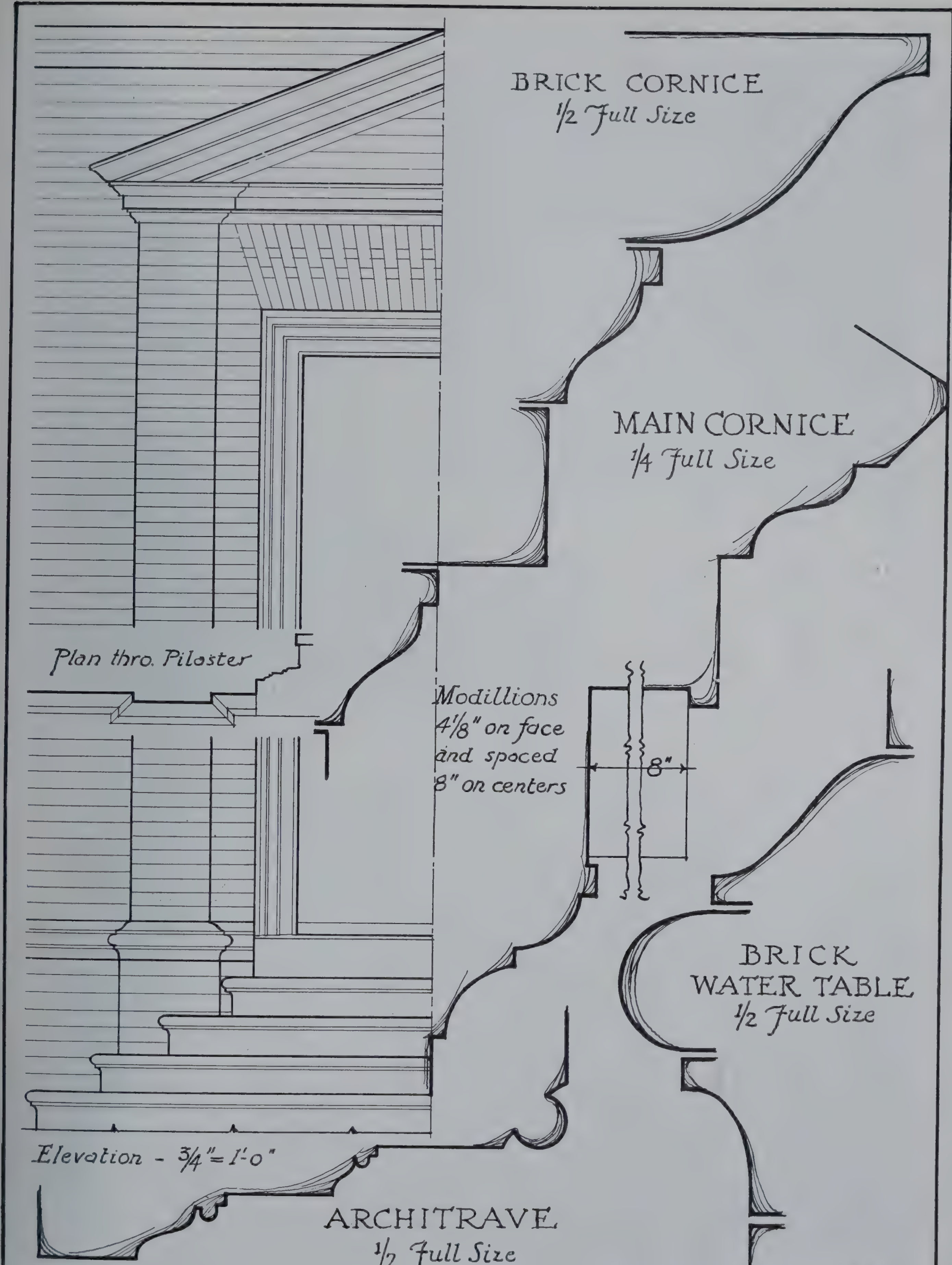
The Forecourt from the Guest Cottage
Showing the original planting now improved

Main Elevation of "York Hall" after Restoration

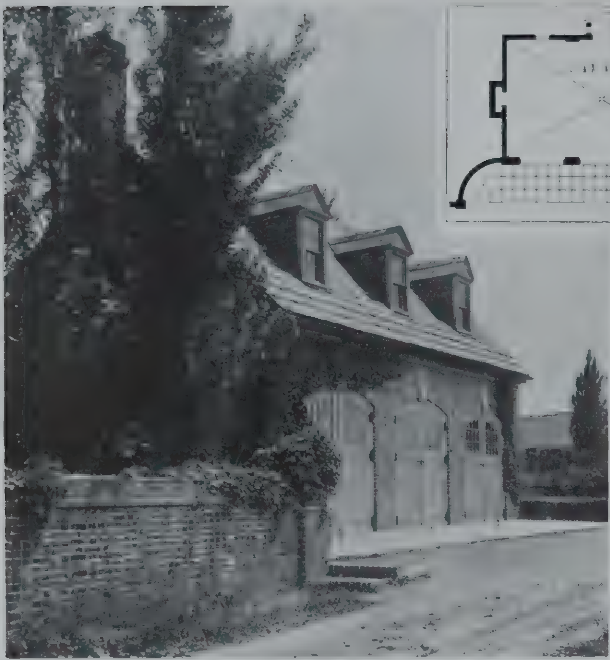
the joinery more perfect. A moulding may change in size and profile two or three times in encircling a room. Several of the paneled rooms are arranged with pilasters supporting the entablature and the curiously fashioned capitals of the pilasters in the dining room are said to have been made by slave workmen from someone's meager description of the Corinthian capitals of Christopher Wren or Inigo Jones. This old dining room is of splendid proportions and dignity; it has a width of 22 feet, a depth of 19 feet and height of 12 feet. The portrait of an old English officer above the mantel helps create an atmosphere in which one may almost feel the presence of the Red Coats, and the hangings and furni-

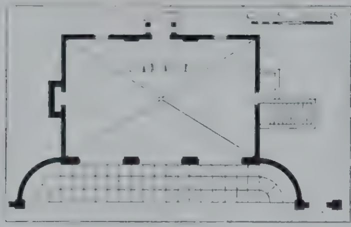


First and Second Floor Plans, "York Hall," Yorktown, Va.



EXTERIOR DETAILS of YORK HALL, YORKTOWN, VA.





Exterior and Plan of Garage

The wood is Virginia pine and when the paint was removed it was found to have turned to a red tone resembling that of rosewood or mahogany. All interior woodwork was removed and fumigated during the reconstruction and its present condition may be said to be as good as when originally erected.

The several rooms have different color treatments; the dining room walls are in lavender and old rose, the drawing room in yellow and white, the study in black and red, and the various bedrooms are blue-gray, green and blue and brown. To give a description of these color effects is not easy; they are not obtained with pure color and the effect is

ture reflect the color and splendor of the eighteenth century. The chief thought of the original builders was given to this room as is evidenced by the greater elaboration in pilasters, cornice and mouldings.

Special reference should be made to the finish of the interior walls. Examination of the old paneling indicated a definite color scheme for each room, and curiously enough the successive coats of paint showed that the original color schemes had been adhered to in previous periods of redecorating.

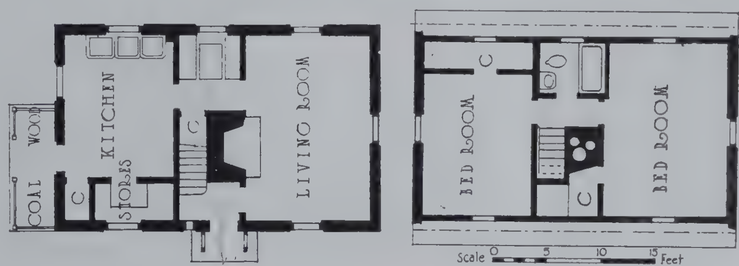
The Guest Cottage before Remodeling

View of Guest Cottage Showing Its Relation to Main House and Its Individual Garden Reconstructed from Old Growth on the Estate

not so kaleidoscopic as the list just given might suggest. They are toned colors, purposely aged in appearance, and are distributed in area in accordance with structural divisions with only a slight degree of difference as may be seen from the accompanying black and white reproductions. The impression in passing from one room to another is a difference in general tone that adds interest to the interior without being strikingly apparent.

A better impression of the effect may be had from a description of the methods employed. In the study, for instance, the color scheme is black and red. The wood was first given a slightly yellowish ground with paint and over this black and Chinese red in their respective positions were wiped on and rubbed down, the red being the secondary color and applied to the bevel of panels and parts of mouldings. All surfaces were then stippled with a purple glaze and dusted. This produced a very mellow and aged effect, the wiping of color leaving the recesses of mouldings and slight imperfections in the wood darker in tone than flat or round surfaces. The appearance of the walls, however, is not in the least "painty"; the colors are put on in thin mediums and the wiping and rubbing afford an opportunity of sensing the

Approach to Guest Cottage from Main House



Floor Plans of Gardener's Cottage

Gardener's Cottage Modeled on Lines of Old Local Fishermen's Cottages

MANTEL IN SOUTHEAST BEDROOM
WALLS DECORATED IN ANTIQUED BLUE AND BROWN

CORNER OF DRAWING ROOM
WALLS DECORATED IN ANTIQUED YELLOW AND WHITE

INTERIORS IN "YORK HALL," YORKTOWN, VA.

texture of the wood beneath the colored surface. The yellow ground shows through the other colors, harmonizing them with the black and gold marble mantel facing.

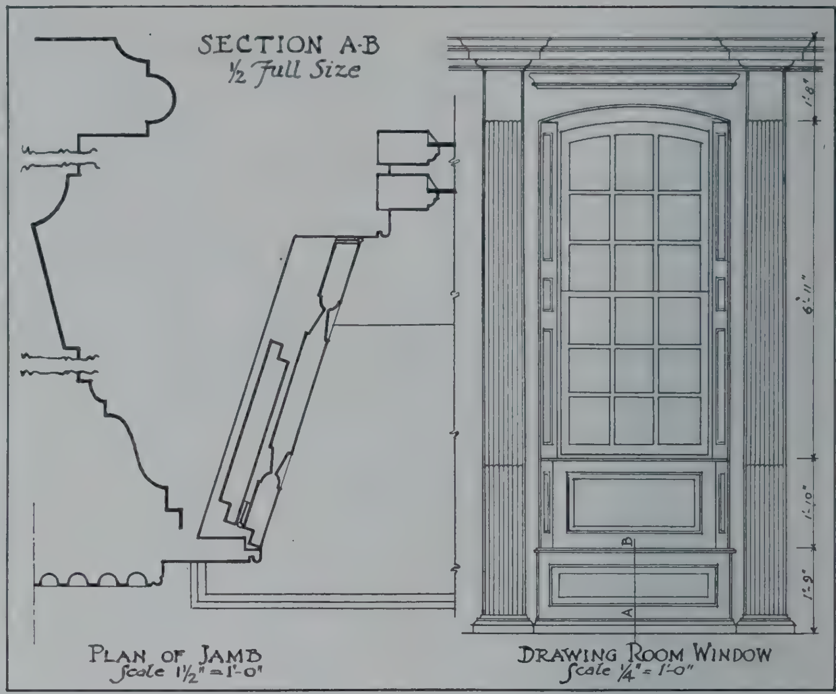
The grounds of York Hall include a smaller building once used as a schoolhouse and of an earlier period than the main house, recalling in its lines the early English cottage, and this has been

Two Guests Rooms in "York Hall"

fitted up as a guest house. Originally fronting upon the road, its entrance has been changed so that it now faces into the grounds about the Hall from which it is reached by a broad walk. The formal garden has been restored and in its arrangement and in the setting of the guest house the landscape architect has used much of the old box which was

Living Room in Guest Cottage Decorated in Blue Green

Window before Restoration



Details of Window and Trim in Drawing Room

originally upon the grounds. The space at the front of the main house, enclosed by a great box hedge, is now being developed to provide a small garden. The entrance from the street is being closed and a still pool arranged in the center of the space to reflect the old doorway, the foliage and the sky. One or two accessory or service buildings, such as garage and chauffeur's cottage which are necessary for present-day use, have been planned in the spirit of the older fishermen's cottages in the neighborhood. Owing to the presence of streets on three sides of the property these buildings have been placed so that access to them and communication with the main house is had by the streets; this avoids a driveway put through the property. An interesting economy in construction is noted in the stable where 4-in. walls of brick are used between piers carrying the framing.

Complete in its appointments and consistent in its arrangement, York Hall is an unusual example of a historic estate which is in no sense a museum but, as in the eighteenth century, an American home.

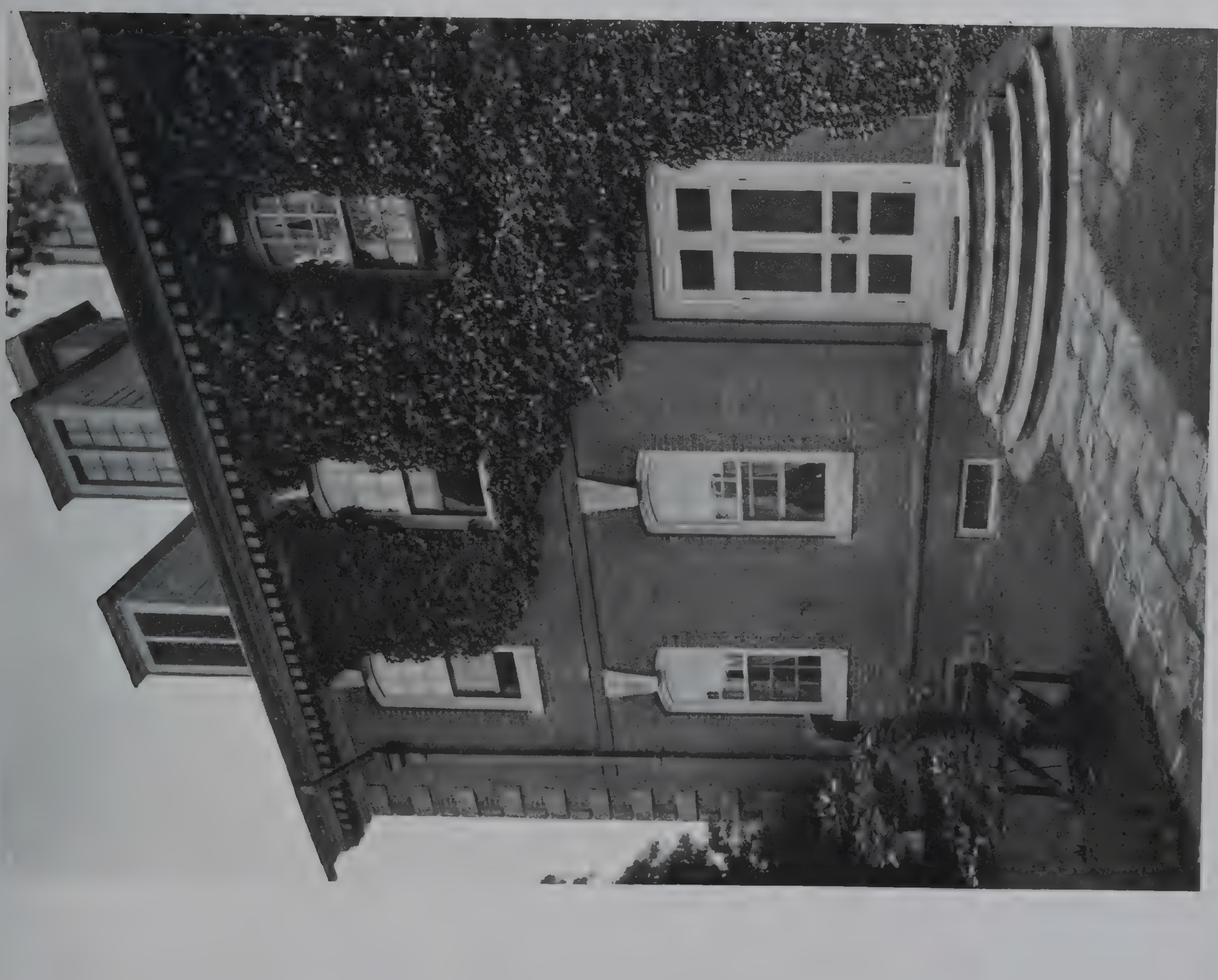
View of Stable from Entrance Court

VIEW FROM THE GARDEN

FORECOURT GATE

"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION



RESTORED ENTRANCE AND ORIGINAL DOOR

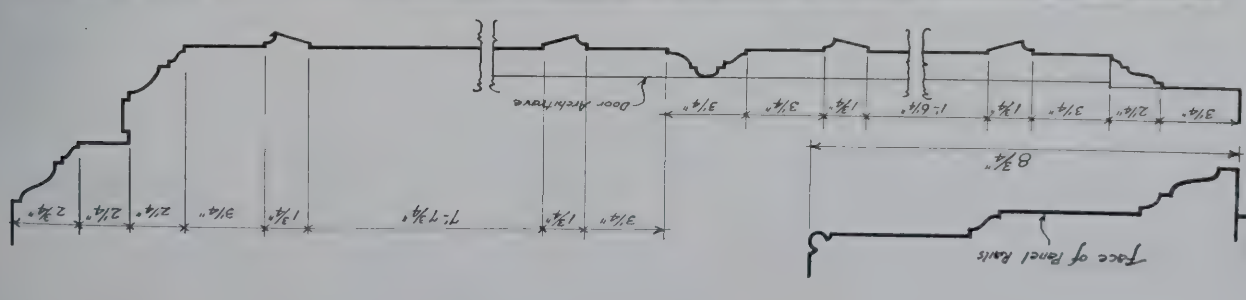
"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION

VIEW OF STAIR HALL

"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION

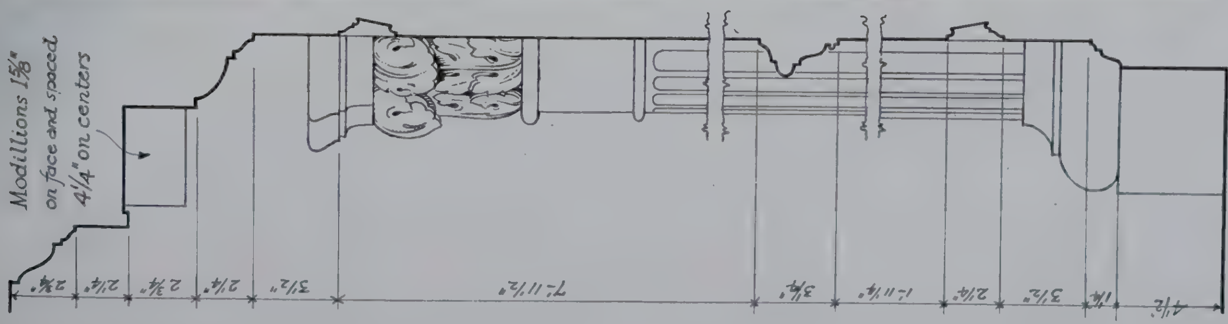


TRIM SECTION
3" Scale
1 1/2" Scale

VIEW OF DINING ROOM

"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION



WALL SECTION
Scale 1½"=1'-0"

DETAIL VIEWS IN DINING ROOM

"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION

CORNER AND MANTEL IN OWNER'S STUDY

"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION

SECOND FLOOR HALL

PRINCIPAL BEDROOM

"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION

TWO VIEWS OF GUEST COTTAGE

"YORK HALL," HOUSE OF CAPTAIN GEORGE P. BLOW, YORKTOWN, VA.

GRIFFIN & WYNKOOP, ARCHITECTS OF RESTORATION

Practical Points in Hotel Planning

By DANIEL P. RITCHEY
Specialist in Hotel Planning and Management

THIS is the third of a series of special articles written by members of the Consultation Committee of THE ARCHITECTURAL FORUM. Mr. Ritchey is the committee member on Hotel Planning and Equipment. Educated as an architect and engineer, he early became interested in the hotel field. He has acted as consultant in the designing and equipment of many hotels and as owner or manager has been in direct charge of the operation of many others in this country. He has also acted as special adviser and as an expert in legal cases involving direct knowledge of hotel operation problems. He is, therefore, particularly well fitted to discuss the subject of this article. Obviously all subjects pertaining to hotel design cannot be discussed within the limits of one article, and Mr. Ritchey will accordingly answer questions on any points not touched upon here.—THE EDITOR.

ARCHITECTS who have been called upon to solve the problem of planning modern hotels realize fully that this is one of the most complex building operations which confronts the profession today. A modern hotel presents in effect a housing problem which is complicated by the transitory nature of its tenancy, wherein the maximum of comfort, convenience and economy is demanded for the short period during which the individual tenant occupies the premises. Hotel planning, unlike any other problem of residential construction, calls for design and equipment to meet the varying demands of the traveling public. It can be built around no individual need but must meet the requirements of every one of the general class of persons who may be expected as guests. In addition to this and equally affecting design, the hotel must be a paying business machine, because it is not built as a speculative venture but as an investment, providing generous returns to stockholders.

Several general developments have taken place within recent years which directly affect the design of the average hotel; of these, prohibition is the most obvious. In years past the hotel owner depended to a great extent on the returns from the bar business to offset a large proportion of his maintenance costs. In many cases the bar returns represented the actual net profit of the business. As evidence of this condition may be noted the recent statement by Mr. Statler that the investment in the Pennsylvania Hotel would have been reduced two or three million dollars if it had been known that prohibition was to become effective. This means that there would have been a definite cutting down of space allowed to bar rooms, grills and sections of the hotel devoted to public entertainment. Naturally, the hotel owner has been forced to seek other channels of revenue to assist in meeting his overhead costs. We find, therefore, that the average hotel problem involves the question of maximum returns from room rentals, the operation of the restaurant on a paying basis, and the development of all possible additional channels of revenue, such as store rentals and returns from concessions.

The position of the main floor with respect to street grade is an important consideration from the operating standpoint, particularly today with the store problem so prominent a feature. Wherever possible the entrance should be on the street level. It is an established fact that hotel guests do not like to climb stairs, and I have noted many instances where the provision of stairs leading up to a lobby has acted detrimentally to the success of the hotel. We may note here that in many of the large hotels the main floors have been remodeled to provide unusually good store facilities, such as in the remodeling of the Hotel Astor in New York, where an unusually clever scheme has been adopted to overcome what at first might appear to be unfavorable floor levels. The additional space for these stores, which will yield a revenue of $200,000 a year, was obtained by inserting what amounts to a new floor between the old first and second floors, with a plan practically identical with the former first floor plan. The level of the former lobby was about three feet above the grade and the new floor for the stores was put in at grade level; to gain the necessary height of ten feet, about seven feet was taken out of the height of the dining rooms on each end of the building, and similarly three feet was taken out of the height of the grill room in the basement by means of a rearrangement of ventilating ducts formerly occupying this space. A new arrangement of the stairs leading to the old mezzanine floor was made so that large landings were created on the new level of the dining rooms, and additional stairs were installed to give access to these landings from two directions. Below these landings octagonal shaped store lobbies were created with a display window arranged for each of the shops. This gives each of the stores display both on the street and in the hotel lobby. To preserve the dignity of the hotel facade the show windows do not project; they are framed in heavy stone architraves and display signs are limited to recessed panels over the windows which are lighted at night.

Before entering upon the discussion of definite points in connection with hotel design and equipment, it is important that we establish two premises. The first of these is the somewhat startling fact that architects to some degree are responsible for many hotel failures; and second, that the first and most important practical point is the importance of working in co-operation with the prospective manager of the hotel during the planning period.

The outstanding features of poor planning which are noticeable in practically any hotel may involve some of these points:

1. Too much space allowed for public use, providing no direct financial return.

2. A poor arrangement of service features, particularly with respect to restaurant service, which adds greatly to cost of operation.
3. Waste of space in the design and arrangement of bedrooms and halls.
4. Too great an investment in mechanical equipment.
5. The use of poor mechanical equipment and interior finish, which results in rapid deterioration and high replacement cost.

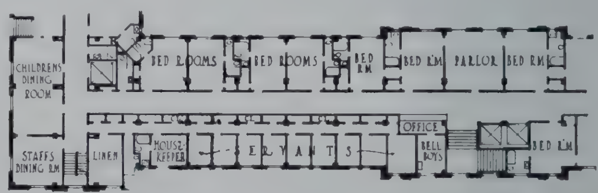
These and other features which will be discussed later represent the defects in planning which are primarily the fault of the architect. The important question, therefore, is *Why have there been so many errors made in hotel planning?* To my mind the answer is to be found in the failure of the architect to work in close touch with a practical hotel manager. I believe that the public generally expects too much from the architect; he is expected to know all the details of hotel operation and the operation of other types of buildings, and to thoroughly digest the client's business requirements which must be met in designing a building. To be familiar with all the details of the modern complex building operation would require a superman or an unusually large organization which the average architect cannot be expected to maintain, as the demand is not steady or in any way to be measured. Consequently, in my opinion, the function of the architect today is to thoroughly understand his business which is that of building design and construction and to bring into contact with his problem on its special phases those whose specialized knowledge must make for the success of the project in hand. The man upon whom the making or breaking of a hotel venture depends almost entirely is the manager. Therefore, to design a hotel without meeting the practical requirements of the manager constitutes a serious error and one which may doom the project to failure even before the books are open for registration.

Selecting the Hotel Site

In selecting the site it is important that it be as near the railroad station as possible. This has always proved to be a more successful location than a distant site, because it represents a saving on baggage transportation and taxi fare and also provides easy accessibility to departing trains when the guest is leaving. The hotel should also be located close to or in the retail and general business section of the city in order to provide convenience for guests and a practical location for traveling salesmen and business men. In any event, the hotel should be located at a point were retail stores can be incorporated in the design. It is better to pay a higher price for the land if necessary in order that this can be done. A new maxim in the hotel business is that store rentals must carry the total cost of the main floor.

Too much stress cannot be placed upon the importance of the preliminary detailed analysis as to the purpose of the hotel and its relation to the needs, not only of the traveling public, but of the community which it serves. Since the coming of prohibition, hotel owners are not particularly anxious to have banquet work or to provide general convention or meeting space. There is not a sufficient return from this activity to invite the necessary additional investment. It is not considered wise, as a general rule, to attempt to include in a hotel space for community activities of any nature, although some elastic scheme for co-operation with an adjoining building which may be designed in connection with the hotel is desirable.

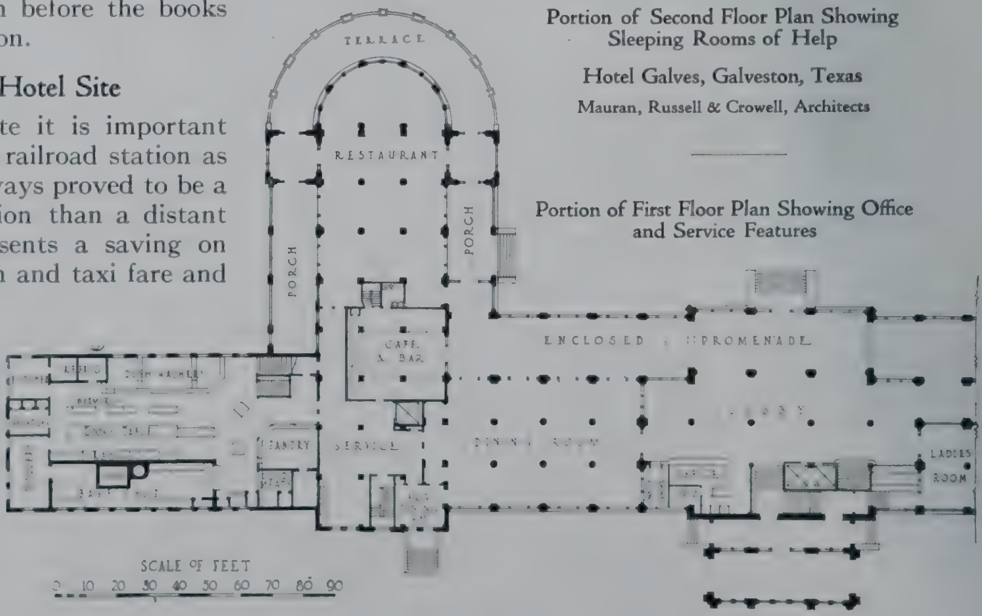
In this connection we may note the Hotel Du Pont at Wilmington. This is an unusually interesting structure in that an entire block is built up, one-half as a hotel and one-half as an office building. In designing these two structures, however, the same floor levels were established and hall lines were connected, so that either building could expand into the other, depending upon the demand. As it happens, this hotel has been quite successful, and by cutting through the party walls a considerable amount of the office space of the adjoining building has been taken for use as hotel rooms.



Portion of Second Floor Plan Showing Sleeping Rooms of Help

Hotel Galves, Galveston, Texas

Mauran, Russell & Crowell, Architects

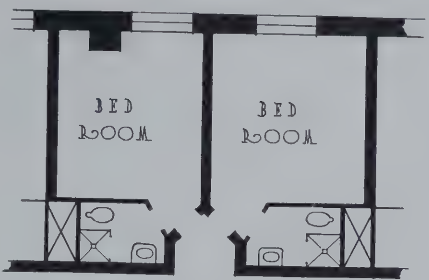


Portion of First Floor Plan Showing Office and Service Features

Laying Out the Main Floor

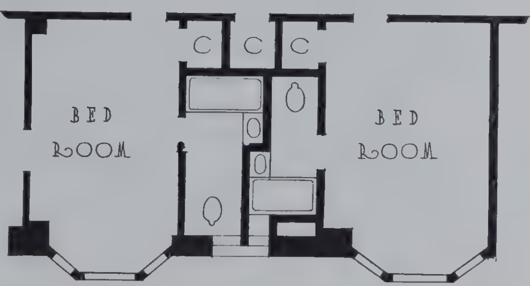
In view of facts already outlined in preceding paragraphs, it becomes evident that one of the important problems in hotel design is the layout of the main floor. The more important objectives in designing this layout are:

1. Convenient entrance for guests and easy access to registration desk.
2. Concentration of registry and room service departments.
3. Minimizing of public space.
4. Provision of maximum store and concession (income) space.
5. Practical arrangement of mezzanine and restaurant features.



Two-room Unit with Interior Bathrooms and Minimum Entry

In the average hotel there should be one main entrance which is directly in view of the registry desk. It is important also to introduce a side or private entrance at some point for women and residents of the hotel who do not wish to pass in and out through the main entrance and lobby. The elevators should be concentrated at one or two points directly in view of the room service department, so that incoming and departing guests will be easily under observation. The service entrance should be placed as far as possible from the main entrance and should be out of sight, on a side street or an alley if at all possible. This question of the service entrance is one which as a rule is not thoroughly analyzed. We may note, for example, one large hotel in New York where for some reason the service entrance was placed on the chief thoroughfare and the main entrance on the side street, probably through a misconception which did not take into consideration many features involved in the use of the service entrance, such as the delivery of unwieldy packages and the handling of deliveries of all kinds. In addition to the main lobby and the guests' service department, the balance of the main floor should consist of space given over to stores and concessions. Income may be derived from a space in the main floor of the hotel, first by the provision of stores, preferably having show windows on the street and in the lobby and from space for concessions such as cigar and news stands and space for the sale of flowers, theater tickets and similar wares. The use of any section of the main floor for a restaurant will as a rule prove a poor investment.



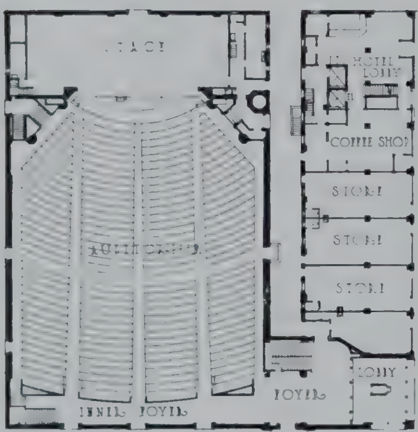
Two-room Unit with Exterior Bathrooms Reduced in Area by Interlocking Partition

The mezzanine idea has now been developed and perfected to a point where such features as lounge, writing room, grills and even kitchens can be placed on mezzanine floors. The plan can be so arranged that the front section of the mezzanine can be used for a lounge or restaurant, giving street exposure without the overhead cost of using street level frontage which should be used for stores. The arrangement of lounge, writing rooms and similar features on the mezzanine has a tendency to discourage the use of these rooms by the general public. The mezzanine thus becomes the center of general activity and avoids the confusion usual on the main lobby floor, a feature which is noticeable in many of the larger hotels and interferes considerably with incoming and outgoing guests. The placing of the kitchen and restaurant on the mezzanine floor has the advantage of providing rapid access from one to the other and avoids the necessity of elevators and stairs which must be used by waiters. This feature is particularly important today when women are being employed more extensively than ever before in restaurant and kitchen service. It is also found that by the concentration of kitchen and restaurant features, much better and quicker service can be provided for patrons and a reduction in the equipment of the kitchen results from arrangement of such quick service features.

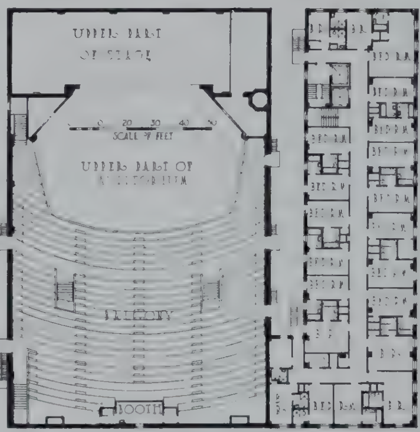
Importance of Good Interior Construction

At this point it may be well to give brief consideration to the question of the interior construction, decoration and furnishing. An architect who is somewhat of a philosopher recently said to me, "Doesn't it seem strange to you that today we build our exteriors to last a hundred years or more, when the interiors are constructed for a life of but 15 or 20 years?" This remark is particularly apropos of the average hotel. One of the greatest annoyances of the hotel manager is replacement cost, and in many instances this replacement cost comes within a short period after the hotel is constructed and is due to the use of inferior qualities of trim, decoration and everything else along the line, including mechanical equipment. The best available interior trim should be used and the best possible plastering should be secured. Poor plaster has been the bane of hotel men. Not only has it resulted in high replacement cost but in many cases the use of cheap plaster has destroyed one layer after another of wall paper through discoloration. The use of wall paper as opposed to painted surfaces, for the guest rooms, has for many years been a bone of contention among hotel men. Both methods have distinct advantages, the painted surface being sanitary and subject to practical treatment. On the other hand, a well chosen design in wall paper has a certain value

General Exterior View



First Floor Plan



Second Floor Plan

Victory Theater and Sonntag Hotel, Evansville, Ind.
J. E. O. Pridmore, Architect

in furnishing hotel rooms, the best of which are bare enough. On the matter of renewal, it has been my experience that both surface treatments require renewal at equal intervals.

The general question of furnishing and decorating is one which is more and more coming under the control of the architect. I find that in many instances special lobby furniture is designed by architects and furnishing and decoration contracts for hotels are often being handled upon a contract basis from general designs developed by the architects. I believe this is a very satisfactory arrangement as it is possible for the architect to provide a harmonious, finished result for the interiors of the main rooms of a hotel by maintaining direct control of furnishing and decoration. Naturally, there is a tendency toward simplicity, and the average hotel today represents a much higher order of taste in furnishing than ever before. While it is not true that room sizes are determined entirely by furnishing, it is true that one of the first activities in designing a hotel is to work out the practical furnishing of the average room, not only as to the pieces which will be installed and the size of these pieces, but as to their actual locations in the rooms, because this will to a certain extent determine the placing of the lighting fixtures and the arrangement of fenestration.

The Arrangement of Service Features

There is practically no limit to the detailed discussion which might be developed upon this subject. For the purpose of this article, however, it is possible only to point out a few definite features. We have already made mention of the importance of having the kitchen on the same floor level as the rooms in which restaurant service is intended. During the past few years great progress has been made in the matter of kitchen equipment; the problem of help has rendered it necessary to utilize every possible labor-saving device, and the cost of building has made it imperative to limit the space used for kitchen and service purposes. In regard to kitchen equipment, architects will naturally seek the advice of experts. There are several large organizations which specialize in this type of work and have developed kitchen layouts on a scientific basis.

It is remarkable how many miles of walking may be saved in a comparatively small but well planned kitchen today. In connection with this article there are presented two illustrations taken from the plans of the Hotel Galves at Galveston, Texas. The arrangement of the kitchen in this hotel is designed to save as much space and labor as possible where extensive service is required. A study of this plan will show various features well recommended. It will be noted that the heat of the oven and stack is centralized; that the scullery is placed in a position of convenience to give efficient service, and that the department of cold foods and hot beverages such as coffee, tea, etc., is convenient to the entrance so that the waiters may pick up anything required in this line without interfering with the order service division. It is difficult to show the entire main

floor plan of this hotel at adequate scale because of its size, but the accompanying portion shows the method of providing entrances and in centralizing the guests' service features, including registration, cashier, manager's office, bellboys and a checking room which serves both as a general check room and for the dining room. It will be noted that guests approaching the elevators or entrances are within sight of the desk. The service section of this building is concentrated in one corner, with the kitchen service room and the main dining room close together. On the next floor and directly above this section will be found the children's dining room, officers' dining room and sleeping quarters for employes. A row of bedrooms for servants will be noted as entirely hidden by a wall along the corridors against which the lockers have been installed. The passageway to these bedrooms leads past the housekeeper's office so that a check can be easily kept. The location of the servants' quarters at this point was made to form a screen to the service entrance directly below, and no guest room overlooks this entrance at a point low enough for it to be annoying.

Naturally, the service features should occupy the least valuable space in the hotel and should be screened as far as possible. All disagreeable features of service should be grouped at one remote point. One important hotel in New York has its coal chute directly in front of the main entrance so that incoming coal and outgoing ashes are almost always in sight of arriving guests and also interfere with traffic at that point. Many other instances might be given of bad results caused by lack of study.

The Practical Layout of a Room Floor

The average practical size of a hotel room is 10 x 14 and the width of corridors 7 feet, although 6 feet is acceptable. The problem is to obtain the maximum of light and ventilation and to utilize every square foot. This immediately involves the question of the location of baths, as it is assumed that each room will have a bath. On the location of baths hotel men differ considerably. My own experience leads me to view the outside bath favorably. In the typical layout with inside baths it is necessary to give up a certain amount of space to a small entrance hall in each room. This space has no practical value as it is never used except to pass in or out of the room. It represents a considerable portion of the total floor space, however, and bears its quota of overhead cost in cleaning and maintenance, and as a rule it must be lighted. The inside bath requires constant lighting while in use, and as a matter of fact lights are usually left turned on and burn most of the day, so that there is not only a consumption of electric current but the heat generated in this way which is not negligible. Guests invariably prefer the outside bathroom in which daylight is available and ventilation seems better. Two room plans are shown herewith which indicate economical layouts, one with outside bath and the other with inside bath. The outside scheme is worked out by an interlocking design which minimizes the space occupied and permits a square room and better placing of furniture. This arrangement allows ample closet space in each room, which is highly important. Many hotels have been built with little or no closet space and this has always proven an objectionable feature and one on which many complaints are made by guests.

Mechanical Equipment

The mechanical equipment of a hotel building is of the utmost importance and in most cases entails employment of engineering service to make certain that layouts are correct and that the equipment selected is dependable. As said already elevators should be placed within the sight of the desk. The location of elevator and stair shafts should be carefully studied in order that the noise of this service shall interfere with the quiet of as few rooms as possible. In one exclusive hotel in New York there were seven elevators installed, located in seven different points throughout the building. Each of these elevators passes a room on each side at each floor and each trip of each elevator disturbs to a greater or less extent the occupants of these rooms. To make this condition worse, the elevator installation is of the type in which cables pass over to shafts on the other side of the building and the noise of the cables in these shafts disturbs another quota of rooms. This installation has been very detrimental to the business of the hotel, as guests insist on avoiding occupancy of these rooms wherever possible or complain strenuously because of the noise. To a lesser extent this condition is to be found in many hotels, and it is a feature which is worthy of careful study on the part of the architect.

The plumbing installation is the most particular part of hotel design. Attempts to conserve expenditure by the use of inferior plumbing have resulted in high replacement costs in many hotels. Pipes buried in walls form a constant menace, rusting out within 15 or 20 years. It is a common experience and a great problem for many hotel men. All plumbing should be accessible in shafts and in some locations it is not particularly objectionable to have exposed plumbing on the ceiling as the parts can be nickeled and are made easily accessible. It is therefore apparent that the first investment in the best available plumbing installation is wise and will be repaid many times as the building grows older.

Unfortunately, in many instances engineers called in to give special advice on mechanical installation are inclined to overdo and to provide too many precautions. For instance, I believe that a reserve installation for heating or hot water which is provided against breakdown service is unnecessary, although it is often specified. In the average city the replacement of parts is simple because of the development of standardization. The excess machinery provided in a reserve installation not only adds to the original cost but adds materially to the cost

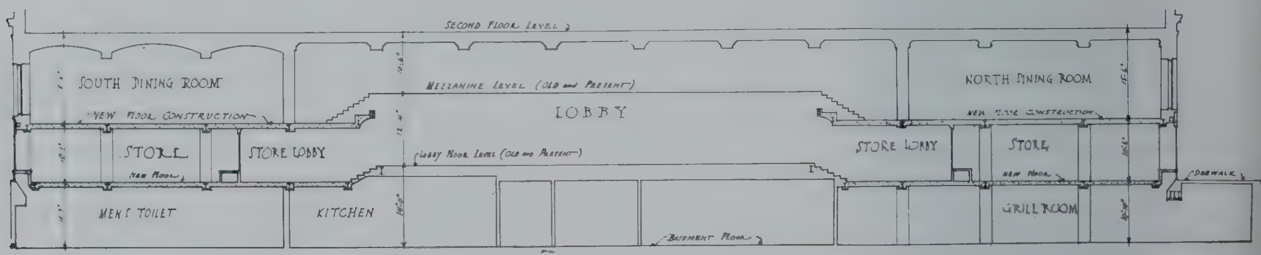
of upkeep. It is also noted that at times the operating engineer who has any tendency toward neglect will depend upon the reserve system and he will allow trifles to develop into large repairs because there is no danger of delay or interruption of service. There is also a tendecy to utilize both systems in alternating times so that there is practically a double cost of maintenance. These facts apply to the power and lighting plants, and the hot water heating system and refrigeration systems.

The question of the isolated plant as opposed to central power station service is one which must be determined in accordance with local conditions and usually is decided by the cost of power.

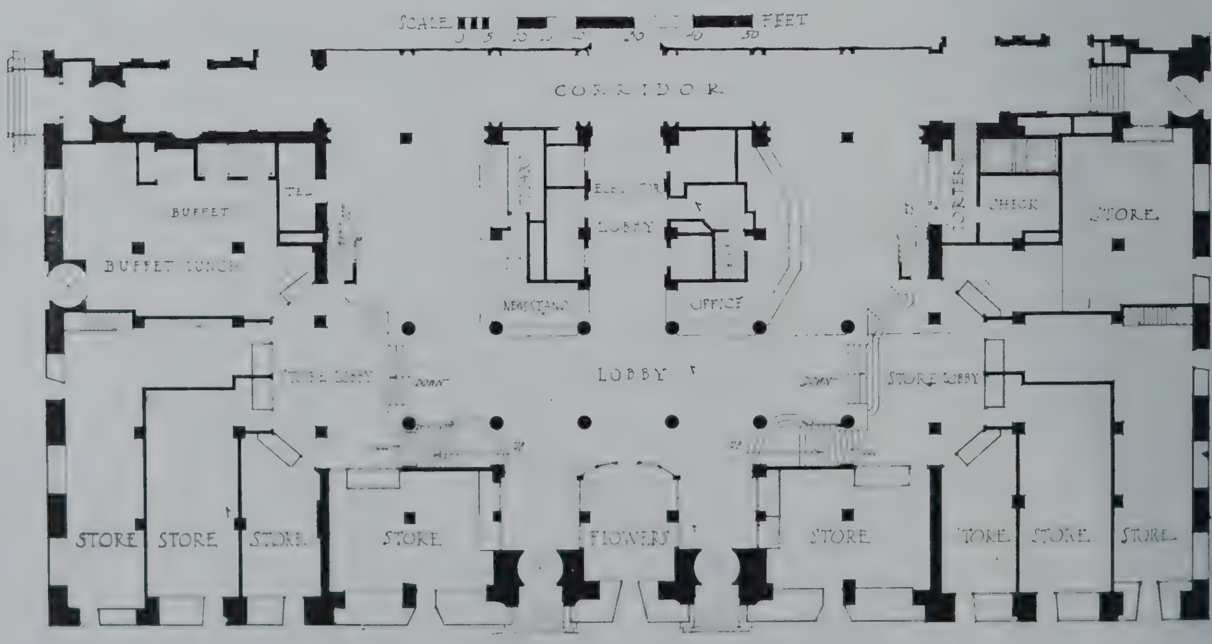
In writing this article, I have been constantly confronted by the temptation to go into detail much farther than either time or editorial space would allow. Naturally, there are many questions in which many architects are interested which have not been touched upon, but an attempt has been made to indicate some of the evident practical points which from time to time I have found were overlooked in hotels which I have analyzed.

The results of several such analyses, even before the advent of prohibition, indicate faulty planning as an important element in hotel failures, and a serious handicap in others. While architects may not with full justice be charged with all planning defects, because oftentimes the owners are lax in presenting the requirements of management and operation, the result, nevertheless, is linked up with the architect's reputation, and he should exercise a professional interest to ensure that he is furnished with all necessary data that will affect the plan.

In general and as a concluding thought it may be said that aside from æsthetic features, hotel design today is essentially a matter of common sense study of the requirements of the business. Not long ago a great railroad engineer said that engineering is 90 per cent common sense and that a man who possessed common sense is 90 per cent an engineer. This statement applies equally well to the question of hotel design. Architects who undertake hotel projects must realize the complexity and the responsibility involved, and they must be ready to undertake a comprehensive survey of the many available materials, devices and items of equipment which are offered in this field today.



Longitudinal Section Showing New Arrangement of Floor Levels



First Floor Plan and Section Showing Addition of Stores, Hotel Astor, New York

Peabody, Wilson & Brown, Architects for Alterations

Systems for Building Heating and Domestic Hot Water Supply

By JAMES A. McHOLLAN, *Vice-president,*
The R. P. Bolton Company, Consulting Engineers

INFORMATION is presented in this article upon matters of interest to architects in the selection and installation of systems for heating and for domestic hot water supply in modern structures. Investment and operating costs are also considered with special attention to the progress which is being made in the use of gas for providing power for these services.

Installation Costs of Heating Systems

It is always of interest to review current costs of installing heating equipment and this schedule, obtained from actual contracts recently awarded, may be of interest in preliminary estimates of the cost of proposed work:

Type of building	Total radiation installed	Number of radiators	Cost of complete system, boilers, piping, valves, covering, etc., per sq. ft. of radiation installed	Type of system
Apartment	9,100	342	$2.48	Vacuum
Residence	2,500	45	2.48	Hot water
Apartment	7,000	250	2.10	One-pipe steam
Institution	4,879	173	2.04	One-pipe steam

SELECTION OF STEAM HEATING SYSTEMS—The two-pipe vacuum or vapor heating system costs about 10% more than a two-pipe and about 20% more than a one-pipe gravity steam system. The improved operation obtained with the vacuum apparatus justifies the extra investment and an architect need not hesitate in adopting this type, notwithstanding the higher first cost. It is more economical in operation; circulation of steam is obtained in less time with lower steam pressure, and the heating results are invariably more positive and satisfactory. If the funds available for the construction of a building preclude the extra investment for the vacuum system, the one-pipe gravity return is the type to install. The two-pipe gravity system should not be considered. It is almost as expensive as the two-pipe vacuum or vapor systems and is no better in operation than the cheaper one-pipe arrangement. The piping layout for a vacuum plant may not differ from that for steam, but devices for eliminating the air in the system are the addition that allows the proper passage of vapor at lowest pressures.

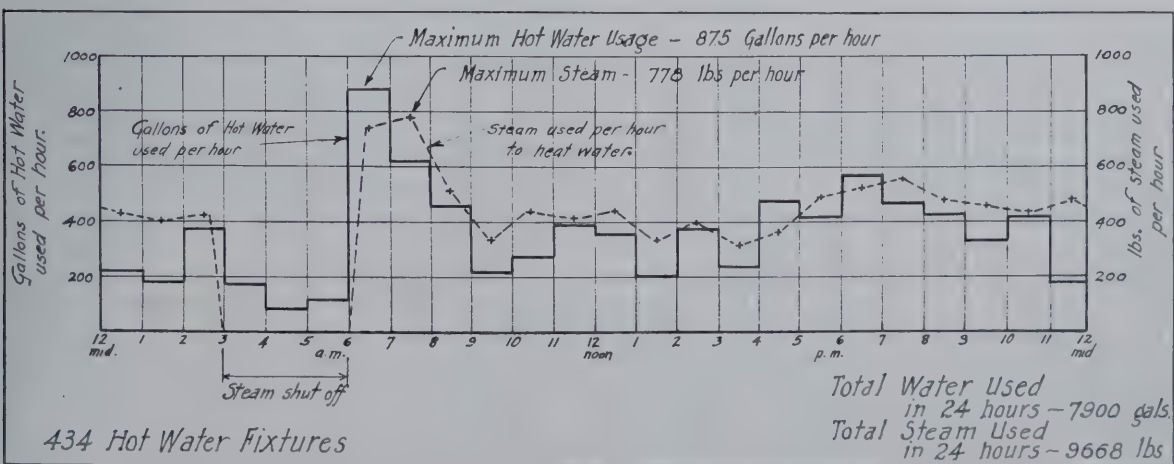


Diagram I

Graph Showing Twenty-four Hours' Operation of Hot Water Supply System for Domestic Service in a Twenty-five-story Office Building

Hot Water Systems—These systems usually cost about 20% more than a vacuum or vapor system, but it is now becoming known that the fuel used in operation is much less than for steam heated radiators. Experiments conducted in a number of buildings equipped with hot water radiators show a saving of about 25% in fuel as compared with buildings of equal size having steam heated radiators. Figures showing the amount of gas used in several steam and hot water installations will be presented later which show a decided saving in fuel in favor of the hot water systems. With regard to the advantages claimed for hot water heated radiators, of flexibility of temperature control, even temperature in moderate weather and the more agreeable heating effect obtained with temperatures of less than 200° in the radiators, the writer's opinion is that a well designed vapor system will provide equally satisfactory service. The greater fuel economy obtained, however, is a matter of great interest. The larger manufacturers of heating boilers are conducting tests in this direction and the engineering departments of several gas-supply companies, whose interest lies in increasing the use of gas for heating and demonstrating lower costs for heating by gas as compared with coal, have already confirmed this saving of 25% in fuel by the use of gas.

Chimneys—The size of chimney in a new building is a question which arises when preliminary sketches are made. If shown too large or too small, an error in size is apt to invite criticism. Here is a rule which is not difficult to apply and it may aid architects in arriving at approximate chimney sizes. The exact diameter should of course be checked by a heating engineer before final plans are prepared:

(a) Multiply volume of building in cu. ft. by .005
(b) Multiply area of exposed wall in sq. ft. by .07
(c) Multiply area of glass in sq. ft. by .3

(a) + (b) + (c) = "x"

	Chimney Height					
"x"	50 ft. Diam. in. or square	60 ft. Diam. in. or square	75 ft. Diam. in. or square	100 ft. Diam. in. or square	125 ft. Diam. in. or square	150 ft. Diam. in. or square
6,000	25"	23"	22"	21"		
8,000	27"	26"	25"	24"		
10,000	29"	28"	27"	26"		
15,000	36"	35"	33"	31"		
20,000		42"	39"	36"		
25,000			42"	39"	39"	
30,000			45"	42"	42"	39"
40,000				48"	48"	42"
50,000				54"	54"	48"
60,000				60"	54"	54"
70,000				66"	60"	60"

Coal Storage Spaces in Large Buildings—A question of importance is the size of bunkers which should be allowed for the storage of coal. The writer appreciates the difficulties of an architect in apportioning basement and sub-basement spaces in the plans of a new structure, but coal is an essential commodity in operation and day-to-day delivery in retail quantities not only increases the cost of the coal but uncertainty as to its arrival causes undue anxiety in severe weather. Fifteen days' storage for winter rate of consumption is the minimum which should be allowed. Thirty days' is better, and if any unused spaces are available in the basement, a connecting doorway or passageway should be constructed so that such space may be used as a reserve bunker if desired. This tabulation shows the maximum coal consumption in cold weather for large buildings, with the storage space recommended.

Type of building	Maximum amount of coal used per day in coldest weather per 1,000,000 cu. ft. of volume	Coal storage space for 15 days' reserve supply per 1,000,000 cu. ft. of volume
Office	4 tons	4,500 cu. ft.
Manufacturing	5 tons	5,200 cu. ft.
Apartment	6 tons	6,700 cu. ft.
Hotel	7 tons	7,800 cu. ft.

Building Heating by Gas-fired Boilers—It is of great interest to consider the progress which has been made in the use of gas for operating heating boilers. For residences, office buildings, factories and public buildings of moderate size, the use of gas under properly designed boilers may effect substantial economy over coal when the expenses of attendant labor and ash-removal with the coal-fired boiler are considered.

One of the best known and largest manufacturers of heating apparatus has just placed on the market a gas-fired boiler which is designed to operate at an efficiency under working conditions of practically 90%. This unit is automatically operated, the burning of gas being regulated by the steam pressure or the water temperature, depending on the type of system in use. A secondary, or master, control of gas supply is provided by means of a thermostat placed at a selected point in the building, by which the gas supply can be turned on at a predetermined hour in the morning and turned off in the afternoon or evening. When steam is not being taken from the boiler, a pilot light is burned which consumes not more than 4 cu. ft. of gas per hour. With gas at $1.25 per 1,000 cu. ft. the operating expense of the pilot light is ½ cent per hour when the boiler is not in active operation.

It will be understood of course that in referring to heating by gas no reference is intended to individual radiators heated by gas since these are seldom used in any permanent building. The chief use of gas is in the operation of heating systems by means of boilers, properly designed to use gas as a fuel and employing the same type of radiators, piping control and valves now in common use with steam and hot water heating apparatus.

Cost of Heating by Gas — These figures show the quantities of gas used per heating season for various buildings. The cost of operation by gas may easily be computed for any installation from the price charged by the gas supply companies according to locality:

Type of building*	Sq. ft. of radiation installed	Type of system	Total gas used cu. ft.	Cu. ft. of gas per sq. ft. of radiation
Residence	985	Steam	840,205	853
Loft building	1,268	Steam	868,900	685
Loft building	1,264	Steam	766,000	606
Residence	777	Hot water	312,000	403
Residence	840	Hot water	342,720	408

* Buildings located in New York

Hot Water Supply for Domestic Service—The apparatus used for heating water for domestic service in buildings consists of heating and storage tanks, boilers and the necessary supply, return and circulating systems of piping. Before presenting figures showing how to estimate for the use of hot water in new buildings, the writer wishes to draw attention to the defects in operation which result from corrosion and incrustation of hot water piping. The physical life of this part of hot water installations is seldom more than seven years, and in many buildings it has been necessary to commence the replacement of piping within this period. As most of these pipes are concealed, the replacement is always an expensive and difficult undertaking. Such a weak point in building construction deserves serious attention.

The corroding processes are caused by free dissolved oxygen in the system which enters with the make up water as it is drawn from the street water mains or other outside sources of supply. If this oxygen is eliminated the corroding processes are arrested and the same length of physical life may then be expected as in other materials used in construction of a building. Devices are now manufactured which effectively remove the oxygen by de-activating or de-aerating the water and these should be included in specifications and plans of new hot water supply systems. Everyone who has been concerned in the operation of buildings will realize the importance of thus arresting corrosion and in this way guarding against failure of the hot water piping within a few years of installation.

Usages of Hot Water—In deciding the sizes of heating and storage tanks, the factor which must be taken into account is the maximum hourly usage of hot water. These figures may be used in estimating the maximum rate of hot water usage in several classes of buildings:

Type of building	Maximum hot water used per hour per hot water fixture
Apartment	3.0 gallons
Hotel	6.0 "
Office	2.0 "
Manufacturing	4.0 "

With the total number of hot water fixtures known, the maximum amount of water which has to be heated in one hour can be determined. The foregoing rates of hot water usage should be used with judgment and unless one is experienced in this work it is well to tabulate the different kinds of hot water fixtures in the building being figured, the number of rooms and occupants, the location of the building, the character of occupancy and the class of service, and have the estimate checked by one or other of the manufacturers of hot water storage tanks.

Efficiency of Hot Water Supply Systems—Diagram I shows a test of a hot water supply system in a large office building. During the test period of 24 hours, there were delivered to the system 65,100 lbs. in the form of "make up" or cold water. This amount was supplied under automatic regulation and represents the consumption of hot water in the building. The steam condensed in the heating coils of the storage tanks for the same period amounted to 9,668 lbs., which included the heat expended in circulation and insulation losses.

The steam required to heat the make up water was approximately 6,320 lbs., leaving a balance of 3,348 lbs. chargeable to the standing losses of the apparatus. Substituting these figures in percentage ratios, the efficiency of the equipment appears to be about 65%. This may be accepted as representative of the typical conditions existing in such buildings, as the installation under consideration is of a workmanlike character and was operated during the observations under excellent fireroom conditions. In view of the lowered efficiency due to circulation and insulation losses, it is important that the highest grades of pipe covering and tank insulation be provided in such systems.

Gas for Hot Water Supply—A test of the cost of gas heating in a 14-story office and printing building showed that 1½ cu. ft. of gas were used per gallon of water heated. This building is equipped with 284 fixtures and the usage of hot water per day is 12,000 gallons.

Operating efficiencies as high as 80% have been obtained in hot water supply systems equipped with gas-fired units in buildings even of large size. Gas is rapidly replacing the use of coal-fired boilers for this service even in the largest buildings. A practical combination where coal-fired boilers are used for building heating is to have these boilers also supply steam for hot water supply during the heating season and in summer to operate the hot water service by means of a gas-fired boiler. This is always productive of economy as the heating boilers can be shut down in summer; no labor is employed and no ashes accumulate for removal.

Note. In the January issue of The Forum Mr. McHollan will continue the discussion of hot water and its usage and also the determining factors in selecting an efficient system.
— *The Editor.*

Steel Design for Buildings

PART V. THE GENERAL ARRANGEMENT AND DESIGN OF A BUILDING

By CHARLES L. SHEDD, C.E.

IN designing the steel frame for a building, the engineer is first called upon to consult with the architect as to the arrangement of the columns. It is best that these should be spaced as regularly as possible and rather less than 20 feet, center to center. The architectural design of the lower floors often limits this arrangement and it is best to have as many columns as possible continuous from the foundation to the roof. When columns are cut off at one of the lower levels the load must be transferred by girders to other columns which can extend through the lower stories, and this sort of construction is expensive, besides making the building as a whole less rigid and more subject to vibration from the wind or other causes.

It is not necessary that the columns line up with each other in both directions, but if they can be so

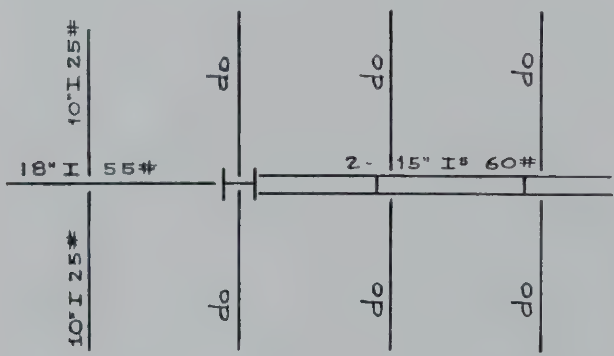


Fig. 1

arranged without inconvenience much better results may be obtained. It is however highly desirable that they line up in at least one direction. When they line up only in one direction the girder beams should extend between the columns along these lines and the floor beams or other floor construction, such as a combination floor, extend crosswise in the opposite direction. It is not necessary that there be a cross beam on each column center in the opposite direction although this adds to the rigidity of the building. Usually floor beams spaced 5′ or 6′ on centers will be near enough to any column to brace it sidewise, any lateral stress being carried to the floor beam by the resistance to bending sidewise exerted by the girder beams. When a combination or other long-span construction requiring no floor beams is used, small ties or bracing beams should be placed in the opposite direction to the girder beams on the column centers. A 6″ beam is about the smallest desirable size for this purpose. Very little if any stiffness is added to the column by the angles which tie the building together for erection purposes because they in themselves offer slight resistance to bending. The connections to the column also are less likely to be stiff enough to resist the bending which they may be called upon to withstand.

When the columns are spaced opposite each other in each direction and floor beams are used it is best to make a design for a typical bay with the girder beams in one direction and another for those in the opposite direction, and compare the weights of the steel required to obtain the most economical design. This weight can be best obtained as so many pounds per square foot. Divide the weight of the floor beams per lineal foot by their spacing on centers and treat the girder beams in the same way, adding these two amounts together to get the total weight per square foot. This of course does not consider connections or tie rods but these may be disregarded in the comparison without changing the result obtained.

Having determined on the arrangement of the beams it next becomes important to determine which way the columns shall be turned. Plate and angle or H column sections are used to illustrate this in Fig. 1, but the analysis would be the same if plate and channel columns were used. The column is weakest about the axis parallel to the web and if this were the only consideration we would place the columns with their webs parallel to the floor beams in the opposite direction from that shown in the illustration, as the girder beams are deeper than the floor beams as a rule and would brace the column better. This difference in depth is, however, small in relation to the story height and other and more important considerations actually determine which way the columns should be turned. These considerations are the design of the detail where the beams connect to the columns and facility in erecting the structure. Where double beams, as for example the two 15″ Is 60# shown in Fig. 1, frame into the column forming the girder beam it is usually much easier to connect them to the column properly if they frame into the flange side of the column than otherwise. The girder beams, too, are heavier than the floor beams and in swinging them into place it is much easier to have them frame into the flange sides of the columns leaving the lighter floor beams to be framed into the web. It sometimes happens, when the columns are small such as 8″ webs, that the flange of a large girder beam, especially the Bethlehem shapes, could not be framed into the web of the column without notching the flanges; such a method means of course added expense and in addition allows less space to work in during erection.

With the exterior column another problem is encountered. Besides turning the column one way or the other, we have to locate the spandrel beams both horizontally and vertically. The column is placed back from the face of the wall some little

distance to allow sufficient covering for fire- and weather-proofing and the beams must be located as far out as practical to carry the wall itself properly. Both the beams and the columns, then, must be located horizontally independent of each other and their resultant positions bear little or no definite relation the one to the other. Vertically, the spandrel beams are dependent for their location on the limitations of the proper design of the connections to the columns. On the side of the building parallel to the floor beams the spandrel could be dropped to come just above the windows if it were not for the connections to the column. If the beams were dropped to this position a channel would have to be placed just inside the wall at the floor level to carry the floor load. These channels would then come quite near to the spandrels in elevation and would interfere with each other in making the connections as well as reducing the rigidity and strength. The top of the spandrels would come at about the same level as the bottoms of the channels carrying the floors. On the side of the building parallel to the girder beams the floor beams would come in above the spandrels making awkward beam to beam connections. In any case, more material would be used especially where the floor beams were parallel to the spandrels. It is always a safe rule to assume that when a load is to be carried it is economical to carry it by as few beams as possible. It is therefore desirable that the spandrels be placed as nearly flush on bottom with the floor beams as practicable after considering in conjunction with the steel the detail of any stone cornices or other structural feature. With the increased use of artificial stone it is much easier than formerly with natural stone to so shape the pieces as to adapt them to the requirements of the steel. Angles can be placed on the outside of the spandrels to fit in the joints of the stone and by balancing the masonry to allow little or no work for the rods which are used to tie the stones in place. An I beam and channel, where the channel is placed on the outside with its flanges turned in toward the I beam, forms a convenient design for most spandrel sections. By turning the channel in this way it is possible to place separators between the webs which will cause them to share the duty of carrying the loads from the walls and floor. By placing the spandrels at the same level as the floor beams a little masonry is left over the windows below which must be carried in some other way. This can be done by a few loose lintel angles extending over and resting about 6″ on the masonry on either side of the window.

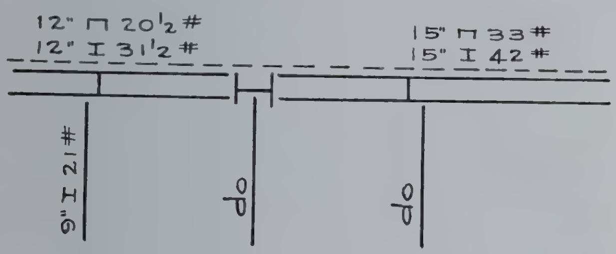


Fig. 2

In Fig. 2 is shown an exterior column with spandrels and floor beams. The column is turned with the web parallel to the wall to allow the framing of the spandrel beams to the flanges of the column. In this way they may be carried by a shelf angle with stiffener angles under it riveted to a gusset plate on the face of the column. The spandrels may be carried conveniently regardless of the eccentricity provided the column is designed for the eccentric loading and a floor beam is framed into the column to tie it back into the building. Here we have an instance where the top and bottom angles used for connecting the beam to the column are much superior to a web connection on the beam. These seat angles on the floor beam make a stiff connection, usually limited in strength by the rivets, provided thick enough angles are used to resist the stress tending to straighten the angle between the rivets in the two legs. It is of course impossible to frame both sets of spandrels into the flanges of the column at the corners of the building. These columns should be turned so that the larger beams may frame into the flange unless it is found that one set of beams is located in such a way as to make it possible to frame them more conveniently into the web than the other set of spandrels.

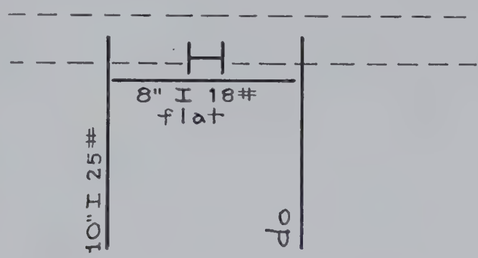


Fig. 3

At the first floor or basement (where there is a sub-basement) it is often customary to allow the beams to rest directly on the wall in order to economize on the size of the column even though the column extend down to the footing below the lowest floor. If this is the case, the column is not supported laterally in either direction by steel. Masonry cannot be calculated to brace the column in this way due to the difference in the moduli of elasticity. In order to brace the column economically at these levels the designer may place a small beam flat between two floor beams as shown in Fig. 3, connecting it by clip angles to the column. This arrangement braces the column efficiently in both directions. The 8″ beam may be placed with the web coincident with the center of the web of the floor beam allowing a standard web connection to be used on either side, and not necessitating the coping of either beam.

The so-called flat roof of an office building or similar structure usually has a slope of from ½″ to ¾″ per foot which makes the grades of the roof

vary considerably from the high points to the lowest. If the roof beams were framed level this would necessitate a large fill where the high points of the roof occur. This fill, besides costing in itself an appreciable amount, adds to the dead load to be carried by the steel work and therefore to its cost. It is the best practice to slope the beams in such a way as to reduce the fill to the minimum. When a beam crosses a valley a line directly over the beam on the roof will slope at one end while at the other

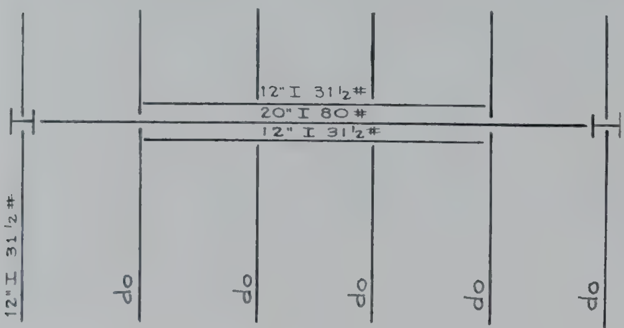


Fig. 4

end of the beam the roof will be level directly over it. The manner in which the beam should slope is determined by that part of the roof which is over the greater part of the beam. If the beam is principally under the slope we should slope the beam, but if under the level part the beam should be level. In a bay where the high point is on two sides and the low point at the opposite corner, if the valley extends diagonally across the bay, the beams on the high side would be level and after passing the center of the bay the beams would all be sloping.

Penthouses around elevator shafts often extend a considerable distance above the roof and when this is done it is frequently advisable to extend the entire column nearest the elevator up far enough to carry the sheave beams. As the elevators are frequently along one of the outer walls of the building and as the greatest part of the elevator load is carried to the rear of the elevator shaft, this brings the larger part of the elevator load directly on the columns.

Girder beams are frequently limited in depth so that two beams are required. When the load is greater on one side than on the other one beam will get more than half of the load unless some means is provided to equalize the load. Separators are used for this purpose, but the ordinary cast iron separator is not capable of transferring any great amount of the load. Riveted separators are expensive, and they too have their limitations. The author has used a scheme illustrated in Fig. 4 to carry the load without the use of any separators at all. If the span of the floor beams on each side of the girder were the same, the two beams could be used as a girder beam and separators would be only necessary to transfer any small inequality which might exist in the actual live load. However, if the spans of the floor beams on either side of the girder beams were unequal there would be a great advantage in this plan.

Let us investigate a specific case to find the relative amount of steel used. For the sake of simplicity let us assume the lengths of the floor beams are alike, using 20′ 0″. We will space them 5′ 0″ on centers and use a total load of 170# per square foot. If a double girder beam were used it would have consisted of two 20″ Is 65# and the floor beams would all be 12″ Is 31½#. If we use the arrangement shown in Fig. 4 the girder beam would be a 20″ I 80# with two 12″ Is 31½# for headers and the floor beams would remain unchanged. It is best to keep the header beams far enough away from the girder beam so that standard connections may be used. This would have to be about 11″. The farther these are kept apart the greater the chance that the floor beams into which the headers frame may have to be increased. Assuming that the weight of the floor beams remains unchanged, which is neglecting the fact that two on each side are shorter than before and two slightly longer, we can compare the weight of the double girder beams against the weight of the single girder beam and headers.

The two girder beams would have weighed 3,250, neglecting the cut-off at the columns, while the single girder beam with headers would weigh but 2,937, which gives an actual saving in the plan shown in Fig. 4 besides getting a better design for the distribution of the loads in a more certain manner. If the building law allowed a large reduction in the live load on girder beams carrying a large area of floor or if the size of the floor beams had been barely large enough, this difference might have been less or the comparison might even have been reversed.

Sometimes there is a portion of a building where it is desired that the floor shall be as thin as possible. A plan which can be used to keep this thin is indicated in Fig. 5. It is best, however, on account of deflection to limit the depth of the beams to not less than 1/24 of their span.

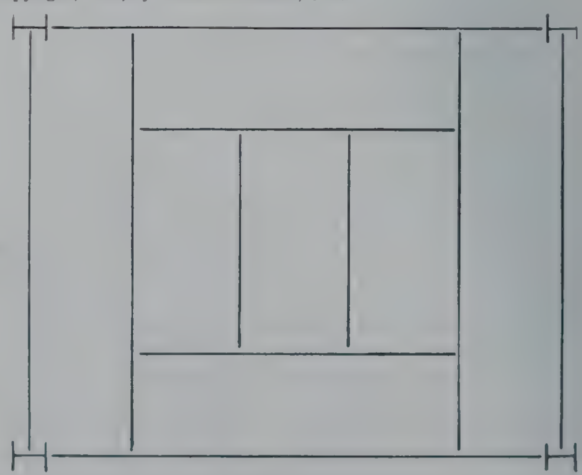


Fig. 5

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Straight Talks to Architects

IV. MANUFACTURERS' LITERATURE—DO YOU FILE IT IN THE WASTE BASKET?

"WASTE in Advertising" was the subject at a meeting of the American Institute of Architects held in Indianapolis on November 10. Representatives of a number of large manufacturers in the building field were present at this meeting. The discussion centered around the question of manufacturers' literature, which constitutes the bulk of mail received daily in every architectural office in the country. Interesting addresses were made representing the viewpoints of both architect and manufacturer.

For the last two years, and particularly during the year 1921, the staff of THE ARCHITECTURAL FORUM has been giving serious consideration to the possibility of closer co-operation on the part of architects and manufacturers. Three of the important subjects under consideration have been, first, the question of waste in advertising literature sent out by manufacturers; second, the failure of many architects to make the most of the service represented by the information conveyed in such circulars and catalogs, and third, the question of the practical value and ethics of using specific engineering service made available to architects by manufacturers, particularly in the line of mechanical equipment for buildings of every type.

We are all familiar with the amount of printed matter which is received constantly in the architect's mail. It arrives in every form known to the advertising and printing crafts. The sizes of circulars and catalogs vary from postal cards to attractively printed and illustrated catalogs, which in some instances cost from $6 to $8 each. It would take all the time of two or three high salaried men to read and assimilate the information coming through this channel into a large architectural office. It is therefore apparent that in the average architect's office much of this material is wasted. It cannot all be filed because of the attendant overhead expense, and consequently much of this sometimes expensive material finds its way directly into the waste basket.

Upon the other hand, this literature is of great value to the architect and is of direct sales importance to the manufacturer. It is evident that under the present situation injustice is being done to both parties and that there is a mutual loss and a mutual "waste in advertising" which carry their quota of direct financial loss to the manufacturer and are in turn translated into selling costs which are ultimately paid by the investor in building construction. To illustrate the architect's viewpoint, we may quote excerpts from a recent letter received from one of the leading architects in the United States, relative to the article under the heading "Straight Talks to Architects" which appeared in the Business and Finance Section of THE FORUM in the October issue.

> "I have a feeling that, in order that the Editor's criticism should be just, he should devote a chapter to waste in advertising, unbusinesslike and impossible methods of indexing, and other suggestions which I could point out at greater length. For example, this firm had in one day six letters from a national advertiser, all duly stamped and addressed, several to each member of the firm as individuals, and several to the firm itself. Multiply this example, if typical, by the number of architects in the country, and realize that the cost of this inexcusable duplication is added to the cost of material and see the result.
>
> "I believe that your journal will be entirely in accord in this matter, but you must realize that construction is probably the most complicated industry extant. Everything which you can do to standardize and prepare the data for architects will be of inestimable value to them and to the public, but at the present time I defy anybody, including your Editor if he had absolutely nothing else to do, to keep track of the situation as it actually exists."

It is quite evident that architect and manufacturer should give serious consideration to this question of sales literature and catalog descriptions of materials and equipment for buildings. The average architect is not making practical use of much of this material, which is of direct value to him. The average manufacturer is wasting money and sales effort in the presentation of extraneous matter in his literature, through the use of poor mailing lists which contain a large amount of duplication and which for other reasons may not be dependable, through presenting his information in a manner which is not of practical value to the architect and through the use of impractical sizes of catalogs and often by the preparation of printed matter which is unnecessarily expensive and cumbersome.

The recent meeting called by the American Institute of Architects, having as its purpose the discussion of this subject directly with the manufacturers, is an important step in the right direction. Of course nothing of a definite nature could be accomplished at one meeting, but it did serve to develop valuable points of contact between the architect and the manufacturer and resulted in the

appointment of several committees to give consideration to various phases of this subject. Most of the officers of the Institute were present, together with representatives of about 60 leading manufacturers and representatives of various architectural publications. The meeting was opened by the President of the Institute, Henry H. Kendall of Boston, who explained the situation concisely, expressing the hope that grounds for co-operation might be established for the mutual benefit of both the architects and the manufacturers. A number of interesting addresses were made by members of the Institute and by advertising and sales managers of various well known manufacturing organizations.

We may note, however, several unusually important points brought out by a few of the speakers. O. C. Harn, Advertising Manager of the National Lead Company, who has had unusually extensive experience in this field and whose opinion is recognized as that of high authority, refuted to a certain extent the statement that architects want nothing excepting practical information which might be contained in facts and figures. It is his well founded opinion that a strong element of sales appeal is of importance in order that the architect should give his consideration to the particular line of material or equipment concerned and may make a preliminary selection of the manufacturing organizations which he wishes to consider. He then reaches the stage of comparison on practical points, such as structural integrity, utility value and prices.

Robert D. Kohn, of the American Institute of Architects, said that the manufacturer certainly has information which is of great importance to the architect and that the architect should not treat the sales effort of the manufacturer as constituting a nuisance to him. Mr. Kohn frankly said that he does not know how this problem is to be solved. He feels that too many superlative claims are made in advertising, but he is also under the impression that the architect is foolish when in writing his specifications he calls for the "best," when in many instances materials or equipment which may not be the best are sufficiently good for the purpose and represent a direct saving to the owner.

In other addresses by manufacturers, it was suggested that the average architect today does not know what he wants in the way of information from manufacturers, which is a statement based on fact because the average architect has given little consideration to this question. One result of this meeting was the formation of four active committees to give serious consideration to the several points involved, and to call further meetings until certain standards may have been established which should result in eliminating a considerable amount of waste of money and time, both by the architectural profession and by the manufacturers.

There are times when the architect is greatly in need of service and information from the manufacturers. It can be readily understood that this is not a stable condition as it depends entirely upon the amount and character of work in the architect's office. It would seem, therefore, that the development of proper indexing and filing systems would be a partial solution to this problem. It must be realized, however, that if fair consideration is to be given to all literature which the architect receives, these files would soon become too cumbersome and the expense of maintaining them too great for the average architect.

The subject of indexing and filing in the architect's office is one which will receive serious consideration in a future issue of The Forum, when we will present methods used by various architects. In this connection we may note the existence of a paradoxical situation. The further we go from the large cities in this country, the greater value we find attached by architects to manufacturers' literature. This is largely due to the fact that in the larger cities the architect can find within easy distance of his office sales representatives of almost every important line of manufacture in the building industry. Through direct advertising, and to a certain extent through direct mailing, he has a certain impression of those manufacturing concerns which are active in different lines, and when he undertakes the design of a particular building, he is in a position to get information quickly. This is not the case in smaller cities and towns.

The average architect who practices in smaller communities is not usually in a position to maintain an expensive filing system. We have noted that inquiries received through the Service Section of The Architectural Forum for manufacturers' literature have been in inverse proportion to the allocation of sales offices. We have been told also that the architect who is not located in close contact with sales outlets gives more study to manufacturers' literature, although he may not preserve it to any great extent.

We believe that the architect would be directly benefited if manufacturers would cut down the volume of direct mailing matter and eliminate lengthy discussion of generalities. We do not believe in limiting direct mail advertising to mere presentation in cold type of facts and figures. While a time may come when the architect must be interested in this subject, he is also interested in examples of successful use or installation and he is impressed by institutional advertising of the right character which will definitely spell to him service and dependability. We believe also that there should be certain standard limits of size, and undoubtedly these will be worked out by one of the committees already referred to. The manufacturer should seek to make his literature at once informative and of practical value.

The average architect does not like to experiment, for many have had sad experiences because of selection of materials or devices which were put forward by new organizations which have not been able to stand behind their products.

Building Activity in 1922

THE question which is uppermost in the minds of architects today relates to the activity which may be expected in their offices in the year 1922. In the early summer, when building activity was not up to normal expectation, THE FORUM predicted that with the coming of fall there would be a noticeable improvement from the architect's viewpoint. Building reports of August, September, October and November show a material increase and our investigations among architects indicate that many offices are becoming active and that the prospect is brighter in almost all instances. It has been our opinion that this stirring in the fall of 1921 would be the beginning of a period of sound activity in the building field, which will probably not assume "boom" proportions but which will represent for several years to come a greater than normal expenditure in the building field, particularly in classes of construction which present subnormal totals over the past few years.

During the year 1921 the cost of construction has lessened materially, due to decreased prices of materials and labor and to greatly increased production on the part of labor. Reasonable progress is being made towards stabilized conditions, and building investors, to a great extent, are working only for normal stability of the market as expressed in the graphic presentation of the building cost situation published in the September issue of THE FORUM in the Business and Finance Department.

In order to gauge the volume of construction activity which has been waiting only this approach towards stabilized conditions, THE FORUM has recently made an intensive survey of work being planned in architects' offices, which clients might reasonably be expected to build as material and labor costs reach stabilized levels. Reports have been received from over one thousand architects' offices giving classification of work, together with estimated value of the new buildings. On the next page there will be found a complete tabulation showing the number of reports received in each state and a classification of the work, together with total volume of anticipated expenditure in each class. This table has been arranged so that percentages might be determined showing the relative volume in dollars of each class of construction in the particular section of the country under consideration. As these reports were received from all types of architects and from offices both large and small, it is fair to assume that one thousand such reports will serve to present fair averages for the entire volume of work which will be controlled by architects over the next year or two. In determining percentages in this manner, therefore, it is safe to assume that these percentages will closely approximate the result which will be shown by actual construction reports, filed as the various plans are completed and contracts let. We have, therefore, for consideration this interesting table showing classified percentages which indicate the relative expenditure in each important class of building construction for each section of the country. By studying this tabulation, the architect will be able to determine with a fair degree of accuracy the *relative demand* on the part of the buying public in the building field.

When the results of this investigation are combined with reports on various important factors affecting the construction market, it would seem that without a doubt 1922 is to be a much busier year for architects than 1921, and that in fact it will be the first of a series of good years for the profession. It would seem that labor costs are well under way toward stabilization on a lower cost basis, and it is reported that in many sections of the country men are coming back into the building trades which were sadly depleted by war industries and by previous lack of employment. Financing for building construction will be easier for 1922 than it has been for the last five years. The investors, both permanent and speculative, are again turning their attention to the building field. It may be noted that in New York, where the construction of apartment houses has been most active, there seems to be no difficulty in selling them.

All architects are familiar with cycles in their business, through which they pass from lean to fat years. When we predicted some months ago that the pendulum had reached the lowest point of its swing in the fall and would start the other way toward better business for architects, it is evident that we were correct. We predict again, therefore, that 1922 is to see gathering momentum as this pendulum swings up and out in a long arc, indicating better business for the architect.

PERCENTAGE ALLOCATION OF PUBLIC DEMAND FOR NEW BUILDINGS

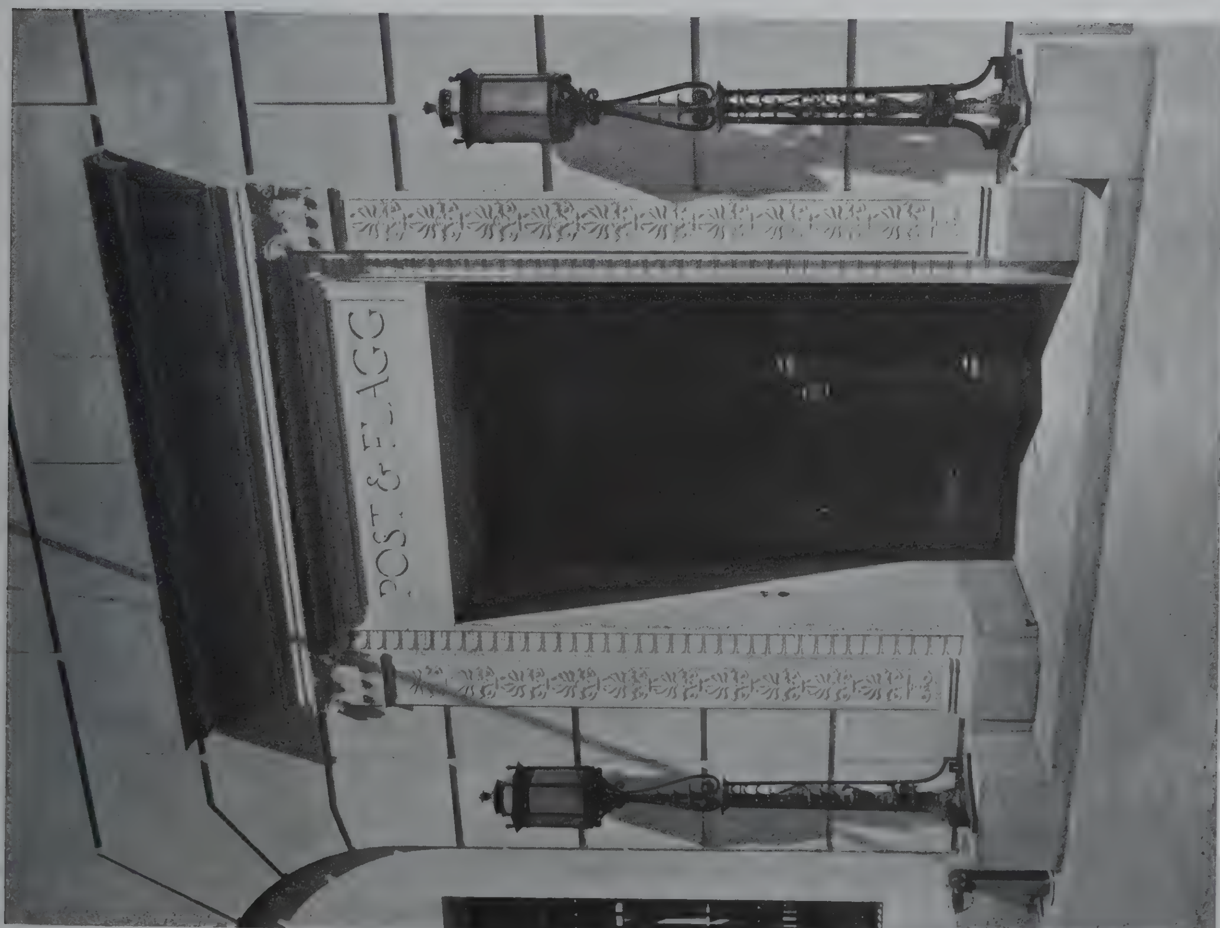
(See also table on next page)

	Dwellings	*Apt. houses*	*Hotels*	*Schools*	*Churches*	*Hospitals*	*Public bldgs.*	*Office bldgs.*	*Industrial*	*Public garages*
Northeastern states...	8.3%	9.4%	5.7%	23.8%	3.3%	17 6%	7.9%	12 %	8.9%	3.1%
North Atlantic states..	10.4	12.5	11.3	15 5	14.5	6.7	7.8	12.8	6.9	1.6
Southeastern states....	10 8	20.4	16	12.5	4.7	4.6	10.1	17.6	2	1.3
Southwestern states...	13.2	11	12.2	14.7	12.6	8.5	8.7	6.1	7.3	5.7
Middle states........	7.2	11.8	11.4	15	12	6.1	12.1	14.1	7.9	2.4
Western states.......	8.1	13.4	12.2	23.6	5.8	10.1	9.1	9.1	5.8	2.8
Average percentage of national demand for architectural service in 1922...........	9.6	13.8	11.4	17.5	8.8	8.9	.9.3	11.8	6.4	2.8

PROSPECTIVE WORK IN THE OFFICES OF ONE THOUSAND ARCHITECTS

Compiled from Reports Furnished by ARCHITECTURAL FORUM Subscribers
Figures in Dollars of Estimated Value (Thousands Omitted)

	Number of reports	Dwellings	Apt. houses	Hotels	Schools	Churches	Hospitals	Public buildings	Office	Industrial	Public garages	Total construction
Northeastern States												
Maine	4	202	600	475	850	104						
New Hampshire	3	164	40		410	50	556	47	12	200	240	
Vermont	2	75	100	50	50			605	180	25		
Massachusetts	50	2,973	3,402	3,000	9,595	773	10,112	2,135	6,363	3,199	1,310	
Rhode Island	7	639	1,005		1,760	730	130	285		182	256	
Connecticut	26	1,122	656	12	2,090	375	100	1,830	911	1,875	122	
Total (in thousands)	92	$5,175	5,803	3,537	14,755	2,032	10,898	4,902	7,466	5,481	1,928	$61,977
Percentage		8.3%	9.4%	5.7%	23.8%	3.3%	17.6%	7.9%	12%	8.9%	3.1%	
North Atlantic States												
New York	148	16,955	16,257	15,620	24,530	6,790	11,315	10,348	20,630	7,963	1,550	
New Jersey	39	3,860	2,514	1,835	7,555	5,715	390	3,375	515	2,575	768	
Pennsylvania	69	7,165	8,413	14,655	10,315	18,015	7,150	3,695	12,627	8,566	1,775	
Delaware												
Maryland	11	414	1,012		980	512	175	3,675	400	540	309	
Dist. of Columbia	9	1,169	7,237		725	10,145		1,025	2,155		100	
Total (in thousands)	276	$29,563	35,433	32,110	44,105	41,177	19,030	22,118	36,327	19,644	4,502	$284,009
Percentage		10.4%	12.5%	11.3%	15.5%	14.5%	6.7%	7.8%	12.8%	6.9%	1.6%	
Southeastern States												
Virginia	10	1,222	810		2,345	281	430	1,800	3,635	340	125	
No. Carolina	9	496	670	1,065	130	710	285	25			215	
So. Carolina	5	532	50		120	15	75	75	55	48	50	
Georgia	7	205	210	450	129	535	150	775	750	100		
Florida	12	716	4,250	4,250	16	418	6	47	693	96		
Total (in thousands)	43	$3,171	5,990	4,700	3,675	1,379	1,371	2,982	5,158	584	390	$29,400
Percentage		10.8%	20.4%	16%	12.5%	4.7%	4.6%	10.1%	17.6%	2%	1.3%	
Southwestern States												
Kentucky	9	780	650		280	290	12	450	60		18	
West Virginia	13	1,540	1,151	1,270	195	590	280	160	1,105	700	510	
Tennessee	7	454	373	60	478	420	460	100	150	325	115	
Alabama	5	400	150		575	485	75	190	400	40	50	
Mississippi	1	31	52		75	15					95	
Louisiana	8	508	143	650	90	130	80	300	152	70	38	
Texas	27	1,755	1,623	1,965	3,865	3,365	1,770	2,402	584	1,864	305	
Oklahoma	10	755	910	1,600	1,230	640	1,110	525	340	330	1,620	
Arkansas	3	102	165	275	230	100	250	17	100	200		
Total (in thousands)	83	$6,325	5,217	5,820	7,018	6,035	4,037	4,144	2,891	3,529	2,751	$47,767
Percentage		13.2%	11%	12.2%	14.7%	12.6%	8.5%	8.7%	6.1%	7.3%	5.7%	
Middle States												
Ohio	57	4,797	6,388	7,825	6,030	4,866	6,250	4,715	5,277	3,368	1,268	
Indiana	38	2,015	2,801	3,300	5,835	1,897	2,140	3,065	1,960	1,260	429	
Illinois	48	2,596	9,673	15,150	7,020	6,587	2,000	11,004	22,385	10,571	1,647	
Michigan	32	3,366	2,185	1,800	3,060	5,335	1,390	2,782	5,020	2,071	1,581	
Wisconsin	23	2,394	2,687	500	4,760	1,720	590	1,918	1,260	650	633	
Minnesota	44	1,990	2,901	2,615	8,226	2,599	1,750	1,445	4,335	3,068	539	
Iowa	21	1,033	3,315	1,090	4,781	11,105	890	3,455	3,185	670	120	
Missouri	34	2,841	6,090	2,810	1,785	1,615	3,286	3,549	1,380	2,863	468	
North Dakota	5	444	100	115	1,070	570	135	505	30	236	390	
South Dakota	3	179	50	65	551	15	175	190	15		60	
Nebraska	14	877	1,630	1,060	3,330	1,775	765	2,770	170	650	390	
Kansas	15	651	425	475	2,080	730	195	3,825	485	82	255	
Total (in thousands)	334	$23,183	38,245	36,805	48,528	38,814	19,566	39,223	45,502	25,489	7,780	$323,135
Percentage		7.2%	11.8%	11.4%	15%	12%	6.1%	12.1%	14.1%	7.9%	2.4%	
Western States												
Montana	7	86	460	1,395	2,295	55	505	240	200	130	100	
Wyoming	3	143	80	30	850	300	20	475	165		100	
Colorado	13	417	960	2,250	1,720	535	640	485	600	395	170	
New Mexico	3	260	25	144			125	65	75		30	
Arizona	2				750	100	150	1,050	400			
Utah	7	345	715	750	1,125	810	350	914		135	109	
Nevada	2	128	190	500		25	30		225	50		
Idaho	4	132	130	675	720	130		150	80	50		
Washington	25	1,487	2,666	1,455	6,795	1,135	1,921	1,892	3,800	667	290	
Oregon	12	465	185	665	305	540	635	2,020	395	1,175	230	
California	49	3,614	6,296	2,763	6,042	1,438	4,410	701	2,040	2,444	1,423	
Total (in thousands)	127	$7,077	11,707	10,627	20,602	5,068	8,786	7,992	7,980	5,046	2,452	$87,337
Percentage		8.1%	13.4%	12.2%	23.6%	5.8%	10.1%	9.1%	9.1%	5.8%	2.8%	



ENTRANCE DOORWAY AND MAIN FACADE

OFFICE OF POST & FLAGG, NEW YORK

GEORGE B. POST & SONS, ARCHITECTS

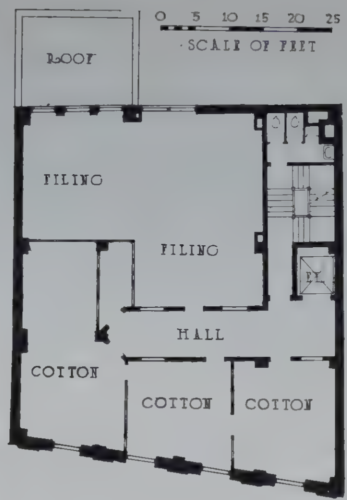
CONFERENCE ROOM

CUSTOMERS' ROOM

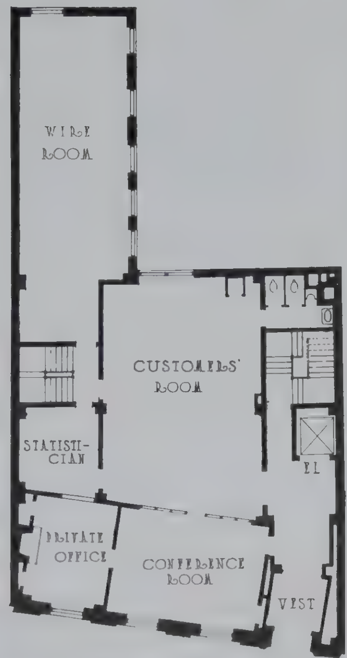
OFFICE OF POST & FLAGG, NEW YORK

GEORGE B. POST & SONS, ARCHITECTS


DOOR IN CONFERENCE ROOM



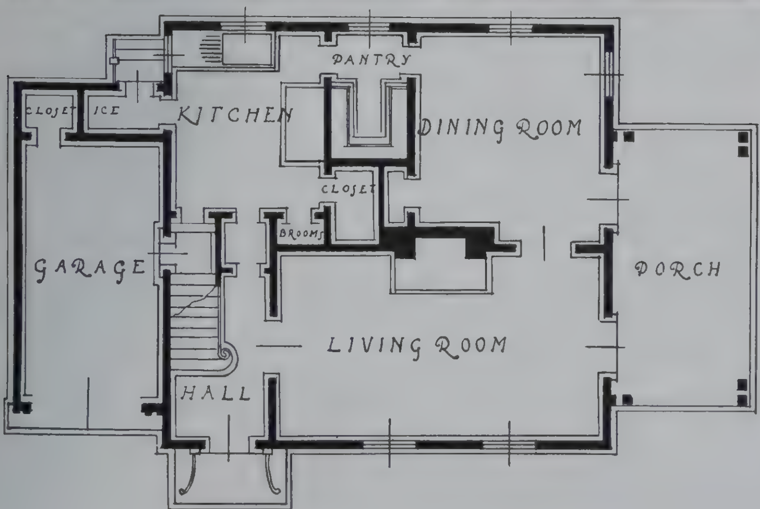
FOURTH FLOOR PLAN



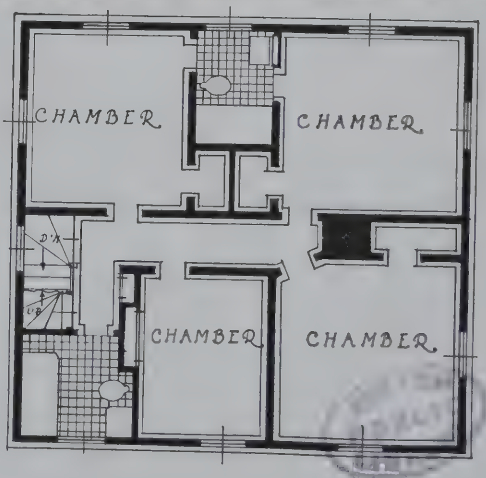
FIRST FLOOR PLAN


MANTEL IN PRIVATE OFFICE

OFFICE OF POST & FLAGG, NEW YORK
GEORGE B. POST & SONS, ARCHITECTS



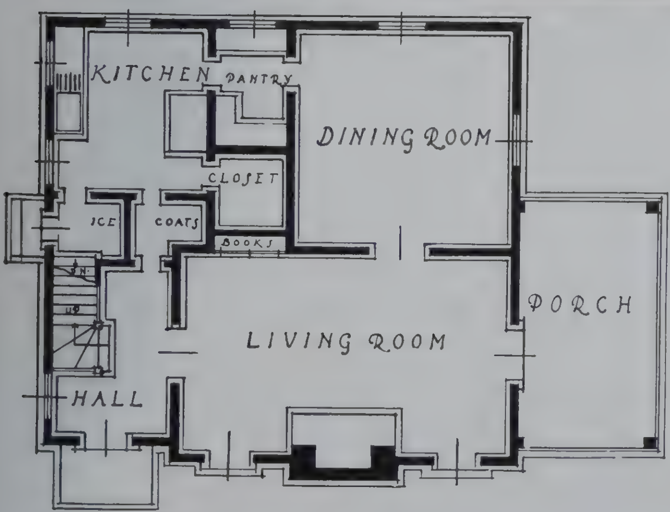
FIRST FLOOR PLAN



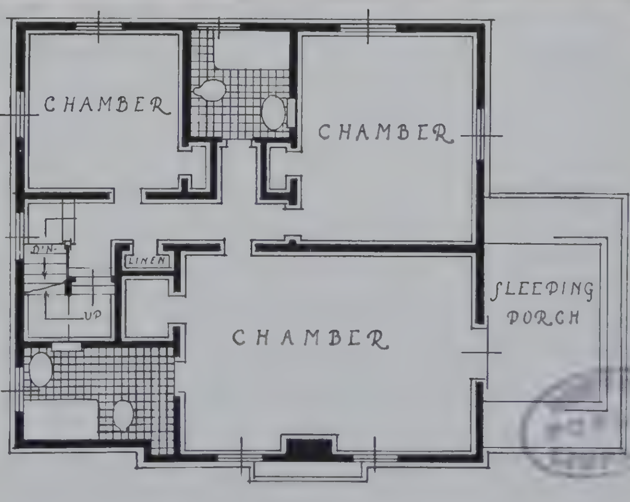
SECOND FLOOR PLAN

HOUSE OF MONTGOMERY L. HART, ESQ., PELHAM MANOR, N. Y.

JULIUS GREGORY, ARCHITECT



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE OF WALTER HAEFELI, ESQ., PELHAM MANOR, N. Y

JULIUS GREGORY, ARCHITECT

Plate Description

Office of Post & Flagg, New York. Plates 85–87. The tendency of banks and financial houses of various kinds to erect buildings for their exclusive occupancy explains the planning of this structure in New York's financial district for a stock and bond brokerage firm. The building, six stories in height, is designed in the style of the English renaissance. Upon the two lower stories as a base the third, fourth and fifth are grouped and arranged with pilasters which carry the cornice, above which is the sixth story. Over the granite base the facade is of marble, with wrought iron guards at the windows of the third story.

The plans of the interior suggest the care and thought with which the architects, George B. Post & Sons, have planned the building. Provision has been made for every department of a complicated business and in addition to public and private rooms for the use of clients there are private offices and conference room for the members of the firm and the necessary telephone and telegraph facilities, bookkeeping and filing departments, storage vaults, etc., while the upper floor is planned as a rest room for employes.

Marble and stone have been extensively used for the entrance hall where the floor is an inlay of pink, black and light yellow marbles and the facing of the wall is of stone laid in slab courses with shallow rustication; the ceiling is of ornamental plaster. The interiors are in the renaissance style indicated by the facade and the walls, in general, are of old ivory mottled in slightly darker tones to produce a parchment effect. In the working parts of the building upon the upper floors a uniform treatment has been adopted with French gray the prevailing color.

House of Montgomery L. Hart, Pelham Manor, N. Y. Plate 88. In this suburban house Julius Gregory, the architect, has secured an unusual result by using matched siding instead of the familiar shingles or clapboards for the exterior walls. Although but of moderate size the house gains dignity from the symmetrical appearance given by the garage at the left which is balanced by the veranda at the opposite end of the house. The arrangement of the main doorway with its platform of brick and its delicate balustrade of wrought iron gives to the entrance the emphasis which its proper treatment demands. The exterior also gains considerably from the absence of dormer windows of any kind.

The floor plans show an arrangement which is convenient and economical of space and sufficiently dignified to accord with the exterior of the house. The use of French windows which open from the living room and dining room into the sun porch makes this an integral part of the house and increases materially the size of the lower floor. The garage is reached through a door under the stairway and its being connected with the house makes its heating and lighting both simple and economical. The exterior of the house is white and the blinds are painted light green.

House of Walter Haefeli, Pelham Manor, N. Y. Plate 89. In designing this house the architect, Julius Gregory, has used brown stained shingles with trim painted white and light green blinds for the exterior, the entire composition being given an added character by the prominently placed chimney of rough stone. The house, while small, is planned to possess a decided dignity of appearance which is emphasized by the added width given by the sun porch at the right.

The interior is arranged to provide a reasonable number of rooms of fair size instead of many rooms small and badly cut up. The principal bedroom is provided with a bathroom of its own with another bath for the two additional bedrooms. In these two houses planned in Mr. Gregory's office the interior finish is white wood, treated with enamel; floors are of comb grained pine and fireplaces are brick. Both houses were built during 1918–19 and their cost was around 25 cents per cubic foot.

Office of Post & Flagg, New York

George B. Post & Sons, Architects

An interesting comparison of scale in which the smaller building holds its position because of sharp detail. Note also the relation of horizontal lines with those of adjoining building

EDITORIAL COMMENT

STRENGTH OF ENGINEERING SOCIETIES

WE recently had the pleasure of attending a meeting of the Boston Society of Civil Engineers. In the course of routine business a long list of new members of the Junior Section of the Society was read. It may be recalled that the activities of this section, which was instituted little more than a year ago, were commented on editorially in a recent issue. Its growth is proof enough of the benefit to the young man.

At the same meeting it was explained that a student engineering society at Northeastern College in Boston was desirous of affiliating with some society of practicing engineers, and that after they had considered the respective advantages of different local engineering societies they selected the Society of Civil Engineers with which to seek affiliation. The result is a new branch of the Boston Society of Civil Engineers, known as the Northeastern College Section. In commenting upon their connection with the Society the chairman made an incidental remark which to us is significant of the successful organization that engineers are able to maintain. He said, "We are glad to see these young men undertaking their engineering society *work* so early." We want to call particular attention to that word *work*, because we feel that in that brief expression is the kernel of the success of engineering organizations.

The engineer looks upon his professional society as the medium through which he is enabled to serve and co-operate with his fellow engineer, and likewise the public. Interest in professional society activities is to him a duty; it is *work* which requires performance just as much as the duties of his individual practice. It is through his society that he largely keeps abreast of improvements in his profession and its relations with the public. He has a highly developed sense of professional responsibility; he looks upon his investigations and accumulation of engineering knowledge not as personal property but as the property of the engineering profession, to be held in trust, shared with his contemporaries, and passed on to the next generation. His constant aim is the improvement and dissemination of engineering knowledge and this is exemplified in his attitude toward his professional societies. The most competent engineer is always ready to acquire knowledge; he is just as ready to impart it, and the engineering society is the common meeting ground of seekers and givers.

How many architects look upon participation in their professional society activities as work? How many architects recognize the value of professional co-operation and back up their belief by membership in architectural societies? The number in each case is pitifully small. Perhaps that provides the answer to many of the problems that beset the architectural profession.

Much dissatisfaction is expressed with the public attitude toward architects. There are repeated suggestions that the public should be educated to an appreciation of architecture and the duties involved in its practice. Frankly, is it so much the public that needs education as it is the architect? The public is ordinarily fair in the bestowal of its recognition and appreciation. Is it not more practical to consider first if the architect is fulfilling his obligations to the degree that will justify public recognition?

Today public service is more needed than ever before. There are problems of immense importance directly affecting the public welfare, the arts, industry and general human relations. The professional man, because of his unprejudiced training and his peculiarly altruistic position in the economic affairs of the world, has special qualifications that give to his advice and opinions unusual value, and they should be placed at the public service. The public will gladly receive this service, and will willingly pay for it and accord it full recognition. The power to give service must, however, first be made a definite reality; the work of individuals must be co-ordinated and directed into productive channels. This can only be accomplished through co-operative effort and today the most effective and practical medium for the co-ordination of professional effort is the professional society.

Architects have in the American Institute of Architects and its local chapters an organized society with potential power to serve the profession and the public adequately, yet its membership constitutes hardly more than 20 per cent of the practicing architects in the country. What is the 80 per cent doing toward the promotion of professional interests? Even though the 20 per cent in the Institute ranks were individuals of the greatest influence, can this minority be expected to carry all the burdens of the profession? Does this state of organization indicate a very extensive belief that interest in professional activities is *work*, a duty calling for serious performance? Where lies the fault? Is it in the character of the organization existing? We do not think so. The fault lies with the individual architect; he is quick to recognize the difficulties that he labors under, but he does not so readily recognize the simple, fundamental principles which if rightly applied will remove the difficulties. Let him take pattern after the engineers, recognize that co-operation with his fellow architects and participation in society activities are *work* of the first importance, and the results will soon be apparent.

DECORATION
and
FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

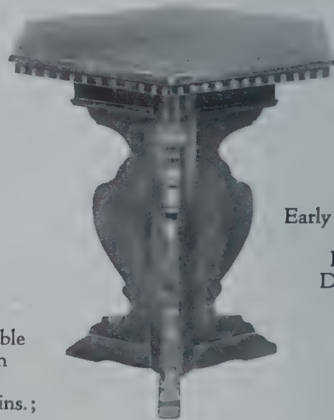
It will be the purpose in this Department to illustrate, as far as practicable, modern interiors furnished with articles obtainable in the markets, and the Editors will be pleased to advise interested readers the sources from which such material may be obtained

Modern Reproductions of Italian Renaissance Furniture

Reproductions of Sixteenth Century Italian Arm Chairs

Italian Fabric in Gold and Color on Gray Ground Repeats 12 ins. in width

Sixteenth Century Italian Center Table
Height, 29 ins.
Diameter, 24 ins.



Early Sixteenth Century Walnut Table
Height, 24 ins.
Diameter, 20 ins.

Below, a Modern Walnut Table Reproduced from Sixteenth Century Italian Example
Length, 6 ft. 6 ins.; width, 33 ins.; height, 31 ins.

Interiors Adapted from the Italian

PART IV. FURNITURE AND ITS ARRANGEMENT (CONCLUDED)

By WALTER F. WHEELER

THE Italian style is essentially formal, and while it holds forth great possibilities for domestic use it should not be employed in rooms where it is necessary that a very intimate appearance should prevail, neither should it be attempted in a room too small to permit of a fairly well balanced, though not necessarily a symmetrical, arrangement of furnishings. The pieces of furniture used in such an interior are not many but to be true to type they must be of bold and vigorous scale, which naturally involves corresponding size, and size requires space for the assertion of the dignity and importance of the pieces used.

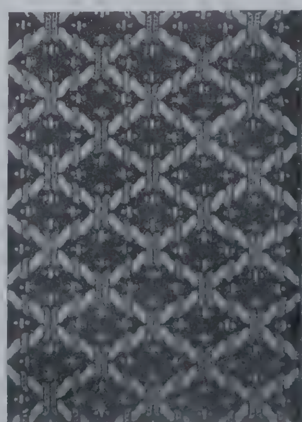
The success of a room arranged in this style demands careful and thoughtful placing of furniture. Most pieces of this type in addition to being of generally robust scale are rectilinear in form and of marked architectural character, and for this reason are seen to the greatest advantage when placed against walls. An Italian interior is apt to be dominated by the fireplace. It should therefore be placed where it will be instantly recognized as the center of architectural interest as one enters the room; the mantel should be seen as a whole and not partially hidden by groups of furniture placed between it and the entrance. Italian appreciation of the full importance of this fact may be the reason that in most of their interiors the center of the room is invariably left open, the furnishings being distributed against the different walls. This arrangement, however, is contrary to American custom so it becomes necessary to adopt some plan which, without entirely destroying the method of Italian arrangement, will render the interior livable and comfortable for American use.

Take, for example, a living room of generous size and of oblong shape, the chimney-piece occupying the middle of one of the longer walls with the entrance to the room upon the opposite side. The creating of the center of interest in front of the fireplace, which is the usual custom in America, would at once destroy the unity of the room by grouping between the chimney-piece and the door the various pieces of furniture necessary, which would cut off the view of the fireplace and mantel as one enters the room. A much better arrangement would be had by arranging two centers of interest, one at each side of the fireplace, facing each other. Each center may be built up by using a davenport of low and suitably broad type, with tables of small sizes and chairs of various kinds at each end, or else each of the centers may be arranged about a long table of suitable form, the davenports or tables in these instances being placed at right angles to the fireplace. Thus, as one enters the room, the chimney-piece will be readily observed, the centers of interest being to the right and left.

It might be, however, that in such a room the entrance would be at one of the ends, in which case the grouping of furniture could be at the middle of the room and in front of the fireplace, since as one enters the room the axes of the open spaces would be parallel with the axis of the doorway, and the group of furniture would not interfere at all with the full view of the chimney-piece. Such a group might include a davenport directly be-

Italian Damask Made in Various Color Combinations Repeats 20 ins. in width

American Reproduction of Gothic Tapestry "Ten Stories of Boccaccio," 7 ft. wide, 8 ft. high



Mohair Velvet Reproducing Italian Design. Diagonals of Diamonds, $3\frac{1}{4}$ by $4\frac{3}{4}$ ins.

fore the fireplace with small, low tables at either end and a long Italian table behind it. Small benches and incidental chairs or tables might be added to the grouping for convenience, but care should be taken that too intimate a fireplace setting is not the result; such a setting would be more in keeping with an interior of some other type—the Georgian, for example, in which the furniture is smaller.

Florentine Table of a Type Popular at End of Fifteenth Century. Suitable for Use in Modern Dining Room or Library. Height, 2 ft. 7 ins.; length, 8 ft. 5 ins.; width, 3 ft. 3 ins.

At least one wall of such a room should be comparatively free from windows or doors so that a formal grouping of wall furniture may be had, and such a grouping would be most effective if opposite the chimneypiece. The group would be best made about some important piece of furniture such as a long table or a *credenza*, several illustrations of which have been shown in these pages, the table or *credenza* being flanked by upholstered or carved wood chairs, while above and occupying an important area of the wall surface there might be hung a tapestry or painting of appropriate dignity. To add to the formality of such a setting there might be added to the grouping a pair of tall Italian torcheres. The other sides of the room would generally be arranged so that they would be less important in appearance than those just described.

A Reproduction of Fifteenth Century Italian Monastic Table 6 ft. in length; 2 ft. wide

Italian Walnut Table Height, 30; diam., 28 ins.

Modern comfort requires the use of rugs or carpets upon floors of wood, marble or other material, and it will generally be found that with the arrangement of furniture determined the question of rugs can be decided so that the rugs will unify or draw together the different parts of the room or the various groupings of furniture. Oriental rugs or chenille rugs in plain colors may be used with equally good results. Color in hangings and upholstery fabrics is of course highly important and should be full and vigorous in tone to accord with plaster walls and the deep toned wood of furniture and architectural features. The Italians used full reds, blues, browns and greens which in materials such as velvets and brocades created a superbly rich effect. The tops of *credenze* and cabinets were high lights, rendered so by bright majolica

Rough Plaster Walls Afford Background for Grouping of Metal Torcheres and Candlesticks and Venetian Metal Console. Hampton Shops, Decorators

Reproduction of Early Sixteenth Century Veronese Cassone. Made of Wood or Composition Gilded and Polychromed
Length, 5 ft. 4 ins.; width, 21 ins.; height, 27 ins.

in color value to the main wall grouping of furniture.

Objects hung upon the walls should be confined to pieces of importance and sufficiently vigorous scale. Tapestries, perhaps, claim first place but of almost equal value are large paintings, either simply framed in characteristic Italian mouldings or with richly carved and gilded frames. Sculptured plaques or bas-reliefs of Della Robbia character are also useful, either in color or in soft terra cotta tones, but small scaled pictures and other intimate objects must be absolutely eliminated if the Italian feeling is to be maintained.

Lighting fixtures in an interior of any kind do much to make or mar the effect of the completed work. The use of torcheres has already been suggested; in many cases they are made of bronze, wrought iron or other metals, but frequently they are of wood, gilded and poly-

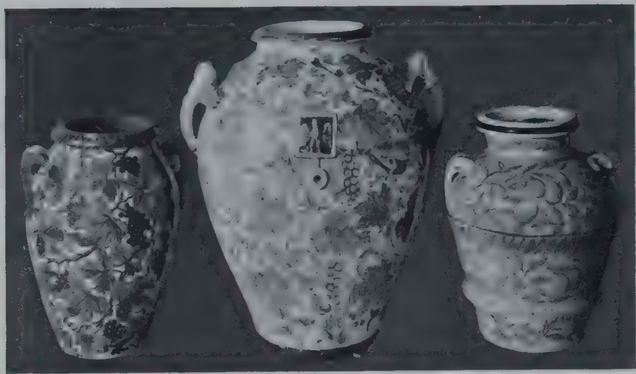
jars, silver vessels and gold and polychromed candelabra. One color should be selected to dominate, but it should never be used exclusively. A room will be more livable and interesting with the introduction of the complementary and other colors proportioned in tone and area to provide harmony. Window hangings in an Italian interior are in keeping with the rich simplicity which obtains in regard to other details. Two sets of curtains are generally used, one of light material against the glass, and heavier draperies on the plane of the wall, falling in long, straight lines from poles or cornices and drawn back and forth by cords. For sash curtains there is a vast variety of fabrics such as the reproductions of Italian filet lace in small, figured squares which are best hung against the glass with no fullness, or the more solid materials of silk and wool mixture, valuable for their simplicity and qualities for tempering the light, while for heavier draperies there are not lacking rich velvets and figured fabrics of different kinds, carefully reproduced from renaissance originals. The positions of windows and their relations to important furniture groupings will largely determine their decorative treatment. Renaissance fabrics as a rule are large scaled in pattern; there must, therefore, be sufficient undecorated area in nearby wall spaces to make them effective, and unless favorably located the windows should be subordinate

Italian Table Showing Spanish Influence
Length, 60 ins.; height, 32 ins.; width, 23 ins.

Italian Sixteenth Century Table
Height, 31 ins.; diameter, 39 ins.

Music Room in Residence of William Ellery, Esq., Brookline, Mass.
Wooden ceiling decorated in color by Robert S. Chase

Upper Part, Modern Venetian Wrought Iron Torchere
Height, 93 ins.; spread, 14 ins.



Reproductions of Old Italian Majolica Oil or Water Jars
Heights vary from 2 to 3 ft.

Upper Part of a Modern Italian Candelabrum
Height, 80 ins.; spread, 18 ins.

chromed, and sometimes portable lights are contrived from carved wooden figures which are gilded and colored. Lights fixed to the walls are used with excellent results and suitable fittings in metal or composition are not difficult to obtain. Fixtures hung from the ceilings are often used and are frequently reproductions of old Italian candelabra. These hanging fixtures, however, should be used only in rooms of generous size, for it must be remembered that in Italian interiors, as with interiors of any kind, fixtures hung from the ceiling have a tendency to make a room seem smaller.

The furnishing of an Italian room need not be a slavish piece of restoration. The three periods of design, early, middle or high, and late renaissance, are well marked but it is not necessary to confine the selection of furniture in a room to any one period. A general sense of uniformity only need be preserved, and this the architect is perhaps better able to appreciate than any other. The late renaissance type will perhaps find less appeal in the average American house than the earlier or middle periods, but the high note of a room might well be struck with such a piece, as for instance, a center table with carved ends or a *credenza* or cabinet filling the important wall space. Similarly, a piece of eighteenth century Italian bordering on the baroque or a brilliantly painted and decorated secretary or cupboard in green, yellow or red after Venetian models might be introduced for relief to the severity of the principal furniture. There is likewise no reason for confining all of the furniture of a room strictly to Italian models. A study of renaissance forms in all countries will show an underlying basis of marked similarity. Thus Spanish renaissance furniture is closely allied to the Italian of the same period; many pieces of the Jacobean and other periods of English furniture fit in admirably with the Italian. It would be well, however, to bear in mind the fact that a mixture of styles should be made

A Reading Lamp of Bronze or Wrought Iron in the Italian Style
Height, 69 ins.; shade, 22 in. diameter

Reproduction of Venetian Walnut Arm Chair
Stuffed seat and back

Reproduction of a "Dante" or "Savonarola" Chair
Davanzati palace collection, fifteenth century

INTERIOR IN HOUSE OF HOWARD F. WHITNEY, ESQ., LONG ISLAND, N. Y.

HOWARD MAJOR, ARCHITECT

Walls of brownish buff plaster; ceiling, polychrome walnut. Door of walnut; architrave of wood and color of wall. All furniture Italian originals, the chair at left being eighteenth century, based on Louis XV style. Hangings of green antique velvet with red introduced in upholstery. Ceiling height, 12 feet.

MUSIC ROOM, HOUSE OF CARL DREYFUS, ESQ., BOSTON

EDWIN SHERRILL DODGE, ARCHITECT

Walls and vaulted ceiling of rough, pale gray plaster; floor of red brick and tile in small units; mantel, a cement reproduction of an Italian original. The niche in the wall has walnut doors having polychromed borders. Ceiling height, 12 feet 10 inches.

with considerable care if a consistent result would be secured. The different periods of the renaissance in Italy involved a certain definite sequence of styles, so intimately related that a chair of say the earliest might easily be found in a home of the later renaissance, but one piece of French furniture carelessly selected in a setting strictly Italian might mean a discord. Care should be taken that any mixture of styles be plainly and obviously intentional and not appear to be due to a mistake.

Modern Italian Wreath of Terra Cotta
Diameter about 30 ins.

The furnishing of a dining room presents what is perhaps the simplest problem in any modern domestic arrangement, because the room is planned for one definite, specific purpose and because in furnishing of any type the pieces for dining room use are unmistakable and well defined. When furnishing in the Italian style the problem is unusually simple for the necessary objects are tables, sideboard and chairs and all these pieces were used during renaissance times and excellent models are available for the guidance of modern architects.

Walnut is generally used for Italian furniture; it possesses a rich and varied grain and assumes with time an especially beautiful patina. Much of the splendor of the older furniture was due to the use which the Italian wood workers made of inlay or "intarsia," which consisted of inlaying the rich surface of walnut with ivory, bone, mother of pearl and various metals, besides ebony and countless other woods which were sometimes stained or treated with chemicals to heighten the richness of the effect. Intarsia was used upon wall paneling, doors and inner shutters, and very largely upon furniture. Certain workers of the period found—just as some modern architects and decorators have discovered—that much of the beauty of this form of inlaying may be had by polychrome decoration. Success depends upon the choice of an appropriate pattern, and in working it out in suitable colors. Intarsia—or its painted simulation—is useful for giving to flat, plain surfaces a high degree of interest. It may be used upon the edges of a table or *credenza* top, or for emphasizing the structural lines of other pieces of furniture, for panels or for use in bands break a monotonous surface up into smaller panels which may themselves be developed in pleasing designs worked out in the same way.

In these articles on Italian domestic interiors nothing has been said regarding the use of

Reproduction in Marble of Antique Italian Tripod

Modern Wrought Iron Door at Mt. Kisco, New York
Benjamin Wistar Morris, Architect

Lighting Fixture Based on Italian Candelabrum
Length, 42 ins.; spread, 20 ins.

Hall on Second Floor, Davanzati Palace, Florence
Illustrating prominent setting of Italian wall furniture

form and finish are made by the most reliable of modern methods which enable them to withstand the high, dry temperature of the heated American house. The same care has been used by the makers of tapestries and fabrics in general, workers in iron and other metals, terra cotta in various forms, and so through all the list of crafts the work of which enters into the making of the modern home.

The unity and architectural coherence which characterized the early renaissance domestic interior were due in a large measure to the fact that both the structure itself and its furnishings and fittings were planned or supervised by a single individual—the architect. Many of the architects of the period actually maintained workshops of their own for the production of furnishings of different kinds for their clients; while other architects, without actually possessing workrooms of their own, surrounded themselves with trained workers in all the many crafts who were skilled in interpreting or developing suggestions or plans supplied by the master. Thus every architect had about him a highly accomplished company all working in close co-operation. The result was a degree of architectural and decorative harmony scarcely approached in later times.

antiques, partly because the present cost of really good examples places them beyond the reach of any but the very opulent, and partly because the development in America of furniture making and similar crafts has reached a point where authoritative and entirely reliable reproductions are available, which as a rule are more satisfactory for actual use than antiques. In the matter of furniture, for example, certain manufacturers are carefully reproducing the most valuable of renaissance pieces, in many instances from great museums or private collections, and their reproductions while leaving nothing to be desired upon the score of beauty of

Reproduction of Florentine Credenza from Davanzati Palace Collection
Made of walnut; first half of sixteenth century. Length, 61 ins.; height, 32 ins.; depth, 23 ins.

The Guardian of Countless Homes

NATCO Residence at West Bethlehem, Pa
C. E. Schermerhorn, Phila. Pa.
Architect

SINCE 1889 Natco Hollow Tile has been in constant demand for all types of buildings—from the small garage to the giant skyscraper. For over thirty years it has protected countless homes against heat, cold, dampness and discomfort of all kinds.

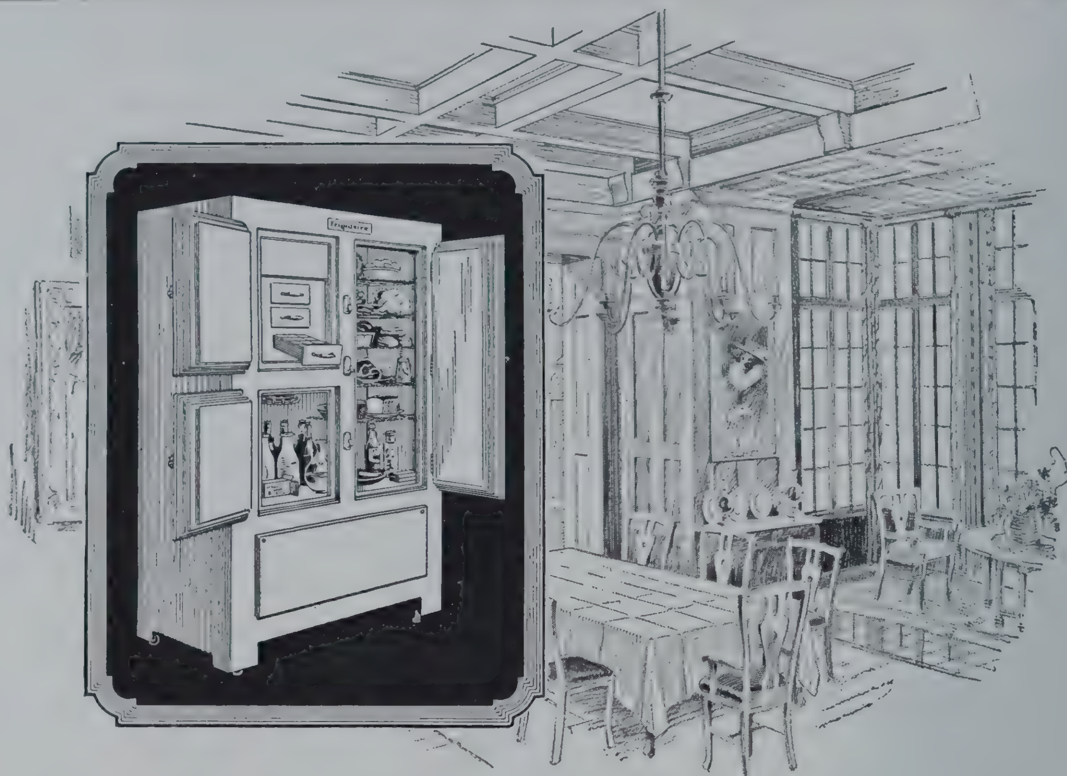
Natco Hollow Tile has made many friends among architects in all sections of the country, and those friends have steadily increased in number year by year.

The reasons for the popularity of Natco Hollow Tile are worthy of every architect's investigation. We are ready at all times to send you our architect-builder literature on request.

NATIONAL · FIRE · PROOFING · COMPANY ·

1402 FULTON BUILDING
PITTSBURGH, PA.

NATCO HOLLOW TILE



ATLANTIC TERRA COTTA, always desirable for the exterior elevations of a building, is a practical necessity when the design calls for modeled detail in color.

The walls of the building illustrated are Atlantic Terra Cotta, conglomerate in color. The Studebaker trade marks, and the sign over the right elevation, are white Terra Cotta against black.

Architectural flexibility, expressed in little details of this kind, is characteristic of Atlantic Terra Cotta.

Studebaker Building, Brooklyn, N. Y.
Tooker & Marsh, Architects
Moody Construction Co., Builders

Atlantic Terra Cotta Company
350 Madison Avenue, New York

Southern Factory:
Atlanta Terra Cotta Company
Atlanta, Georgia

The BILTIN

CHINA

BATHROOM ACCESSORIES

(Patented)

©

QUALITY EQUIPMENT

Fairfacts Bathroom Accessories are specified regularly by many distinguished architects and are in use now in many of the finest homes in this and other countries. The various fixtures are designed to meet every requirement of good taste

The Fairfacts Company
INCORPORATED
234 WEST FOURTEENTH ST.
NEW YORK, U.S.A.

A Handbook On

Hollow Tile Construction

Send for Your Copy — It's Free!

ARCHITECTS are all sending for this handbook, which gives the latest news and the best technical information about tile. Prepared by the Hollow Building Tile Association.

If you have a question about this popular building material, you will find it answered here. Complete charts, tables, etc.

You can profitably use this information in your business. Send for your copy today. It's free. The Hollow Building Tile Association, Dept. 1112, Conway Building, Chicago, Ill.

HOLLOW TILE

The Most Economical Form of Permanent Construction

Hard-n-tyte

is easy to apply, costs little and makes concrete floors durable and dust free. The Hard-n-tyte Specification has been prepared for your assistance. it covers every detail of finished floor construction and Hard-n-tyte application. Write for your copy.

General Chemical Company
25 Broad Street New York

GC-34

Puerta del Sol
Toledo, Spain

You Can Always Identify
STIPPLED BRICK

by the stippling—slight longitudinal incisions irregularly but evenly distributed over the faces, producing a soft, refined texture of a distinctive and individual character.

This stippled texture, protected from imitation by patent rights, has proven most effective in diffusing light to bring out the utmost beauty of the brick colors.

Stippled Cloisters

Our Cloister Brick, which has been one of the most popular bricks ever produced because of the beauty of the red and brown shades and the subtle variations in tone secured by edge-setting in the kiln, is now being made with a stippled texture.

Combining Cloister qualities with the individuality of stippled texture has produced a most unusual face brick that will unquestionably enjoy an unprecedented demand.

Doric and Gothic Stippled Brick

The Doric shades comprise six tones of buffs and tans, ranging from beautiful delicate buffs with a pinkish tinge to very dark purplish browns and black. The Gothic shades offer rich colorful reds and browns in five variations,—red with subtle old rose tints, brownish red mixtures, dark rich browns, very dark browns and black.

The exceptionally delightful colors of Cloisters, Dorics and Gothics, enhanced by the stippled texture to produce a finishing material of the highest order, will provide precisely the most appropriate facing for any type of building—the modest dwelling or the monumental structure.

Write Department 112 for a booklet on Stippled Brick

WESTERN BRICK COMPANY
Danville, Illinois

Capacity
One Hundred
Million Annually

Clinton
Mortar Colors

have been in use longer than those of any other make. Since 1887 architects and contractors throughout the country have insisted on this brand.

Their record for strength and permanence is written clearly through the years.

Only the purest and richest ores are used in their making. They are absolutely free from anything which could possibly weaken the mortar.

Let us send you complete information

Clinton Metallic Paint Company
Dugway Road - - - Clinton, N. Y.

CLINTON METALLIC PAINT CO. TRADE Clinton MARK CLINTON, N.Y.

Parker Pen Co., Janesville, Wis. Frank Carpenter, Architect

The Floor for Service

To assure your clients a maximum of satisfaction and service from their floors — durability, economy, comfort and healthfulness — specify

T·M·B FLOORING
THE Mastic Floor

Applied in plastic form over new or old floors of cement, composition or wood, ***T-M-B Flooring*** forms a sanitary, seamless floor of resilient texture that will not crack or loosen. The cost of installation and maintenance are both low.

Write Department 2 for complete information

THOS. MOULDING BRICK CO.
133 W. Washington St. CHICAGO

Economical Construction

A Department of Practical Information

1st YEAR DECEMBER 1921 *Edited by* William Carver, *Architect*

Brick Veneer is a Pretense

Costs as much as good construction

Reliable manufacturers of brick, anxious to have brick used only in ways that will reflect credit on their material, condemn veneer on frame.

*"In architecture another and a less subtle, more contemptible violation of truth is possible; a direct falsity of assertion respecting the nature of material."

It is natural to expect that a building apparently of brick will have the attributes of a brick building—permanence, strength, fire-resistiveness, etc. These qualities are not possessed by brick veneer on frame. It pretends to a worth that it does not have. It pretends to be what it is not.

*"Leave your walls as bare as a planed board, or build them of baked mud and chopped straw, if need be, but do not rough cast them with falsehood"

*John Ruskin—
"The Seven Lamps of Architecture"

Experienced Building Official on Brick Veneer

Reporting recently on this type of construction which had been proposed for two-story schools, a building official of a western city has this to say:

"I find the type of building recommended in said document (brick veneer on frame) is a dangerous type of construction for the following reasons:

"Should an earthquake occur during recess or while children were playing on the grounds, the veneering would shake off and, no doubt, seriously injure many of the children.

"A solid masonry wall will confine a fire for more than a day, and about one hour is the limit to the veneered wall. Also, when fighting a fire the studs burn through and the veneering collapses, making it very dangerous to firemen.

"Worst of all, veneered buildings are subject to dry rot. In all of my experience I have yet to find a veneered building twenty years old which has not been subject to dry rot or has much structural value left.

"Under favorable conditions a brick veneered building does well to last twenty years. Many reach initial failure before this time. In fact under ordinary conditions the housing of children in any two-story veneered building which has stood sixteen to eighteen years is a dangerous undertaking.

"With the above in mind I cannot recommend a veneered building. Also, many of the bonds are issued for a period of forty years, yet the veneered school building will scarcely last twenty years at best."

BRICK VENEER ON FRAME

NOT FIRE-RESISTIVE FROM INSIDE
DIFFICULT TO FIGHT FLAMES
MAY COLLAPSE ON FIREMEN
NON-PERMANENT
DECEPTIVE, UNSOUND CONSTRUCTION

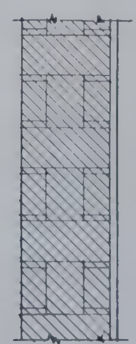
Have You a Copy of this Brick Manual?

For 25 cents only, we will gladly send this 72-page construction manual—"*Brick, How to Build and Estimate*". Some of the subjects covered are: The Ideal Wall brick in fire-resistive and slow burning construction; brick in fire and party walls; compressive strength of brick; fire-resistiveness of column coverings; cement and limes; sand; mortar colors; selection and preparation of mortar; bonds; joints; fireplaces and chimneys; brick construction in freezing weather; and many other topics. If the local brick manufacturer cannot supply you, write The Common Brick Industry of America, 1309 Schofield Building, Cleveland, Ohio.

Real Brick Construction Costs Less than Sham

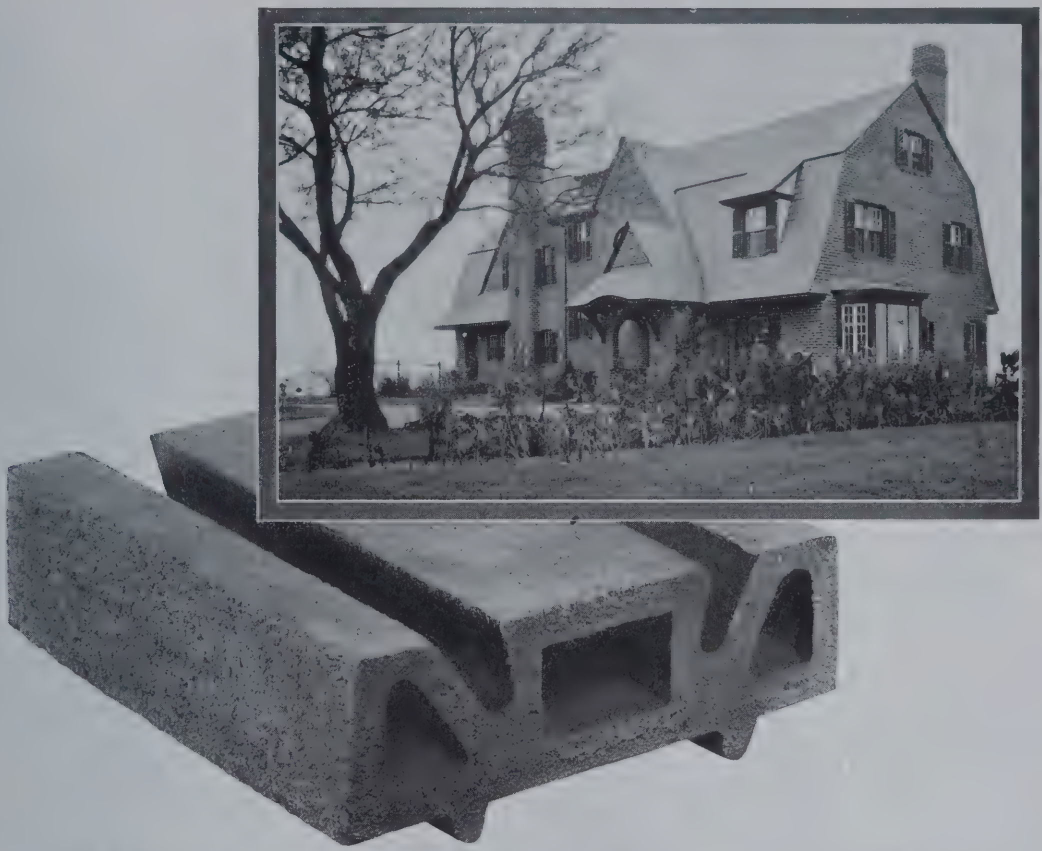
Walls of traditional solid brick construction, generally, cost no more than brick veneer on frame. The Ideal Wall costs less.

For data on Ideal Wall and other information on brick, see Sweet's Architectural Catalog, 1921, pages 107-114. The Common Brick Industry of America, 1309 Schofield Building, Cleveland, Ohio.



SOLID OR IDEAL WALL

PERMANENT
FIRE-RESISTIVE
SAFE FOR FIREMEN
HONEST, SOUND CONSTRUCTION



Technical High School, St. Cloud, Minn.
Tyrie & Chapman, Architects
Laurence Construction Co.
General Contractors

Roemer Hall (Administration Building) Lindenwood College, St. Charles, Mo.
Labeaume & Klein, Architects
W. M. Sutherland Building and Contracting Co.
Contractors

Community High School, Granite City, Ill.
Wm. B. Ittner, Architect
R. B. Higgins Construction Co.
Contractors

Carney's Cement is producing uniformly solid walls in hundreds of school buildings throughout the country

Better Walls at Lower Cost

HOW good and how economical are standards by which construction materials are now specified and used. Better Wall Work at Lower Cost vitally interests architects, contractors and building owners.

Lower cost from foundation to roof is the universal experience where Carney's Cement is used for brick and tile mortar. Only two materials to mix, Carney's Cement and sand; no labor, time and trouble required in slaking and mixing lime.

Plastic, smooth-working qualities allow masons to work faster and with less effort, resulting in more work from men, more bricks per barrel and more laid per day.

These and many other advantages have made Carney's Cement the choice of leading architects and contractors for brick and tile work in many of the nation's best buildings.

One part Carney's Cement, three parts sand, no lime, is The Bond That Guarantees The Wall

CARNEY'S CEMENT COMPANY, Mankato, Minn. Cement Makers since 1883

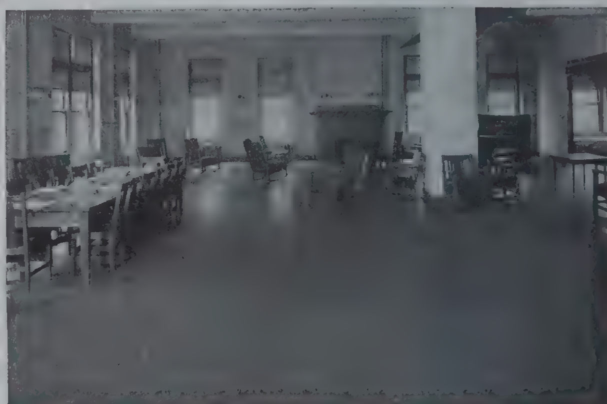
DISTRICT SALES OFFICES:

THE CARNEY'S CEMENT SALES CO.: Leader-News Bldg., Cleveland; Omaha National Bank Bldg., Omaha; Chamber of Commerce Bldg., Chicago; Syndicate Trust Bldg., St. Louis. JAS. QUINN, JR.: Book Bldg., Detroit
CARNEY'S CEMENT CO.: Builders' Exchange Bldg., Minneapolis

CARNEY'S CEMENT

For Brick and Tile Mortar


"Spreads like warm butter"
TIGER
White Rock
FINISH
50LBS
NET
MANUFACTURED AT WHITE ROCK, O.
The Kelley Island Lime & Transport Co.
GENERAL OFFICES - - CLEVELAND
TIGER FINISH



Mechanics & Metals National Bank, Cunard Building, New York
Benj. W. Morris, *Architect*—Carrere & Hastings, *Consulting Architects*

WINDOWS *for* BANKS, OFFICES, SCHOOLS, HOSPITALS, *etc.*—ENGLISH CASEMENTS

CRITTALL PATENTED UNIVERSAL

CRITTALL

Steel Casements

for substantial, artistic buildings

Made in varied designs to meet all conditions

Crittall Casement Window Co.
Manufacturers, DETROIT, MICH.

Hoffman Casements

U. S. Soldiers' Home Hospital N.H.D.V.S. Sawtelle, Calif.

W. A. O. Munsell, Supervising Architect Los Angeles

THE sash are hinged together at the meeting stiles and may be opened several inches at this point in a wide V shape before losing contact at the jambs, thus permitting ventilation by air circulation only and effectually breaking direct draft.

WHEN fully opened the sash fold into small space and may be placed at either side of the opening for the deflection of air into the room or at any intermediate point between the jambs for regulating the amount of air so deflected.

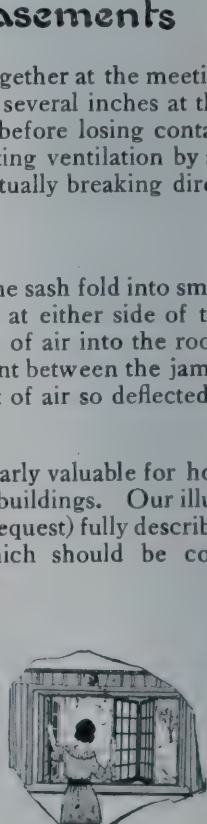
THIS feature is particularly valuable for hospitals and desirable for all buildings. Our illustrated booklet (free upon request) fully describes many other features which should be considered by home builders.

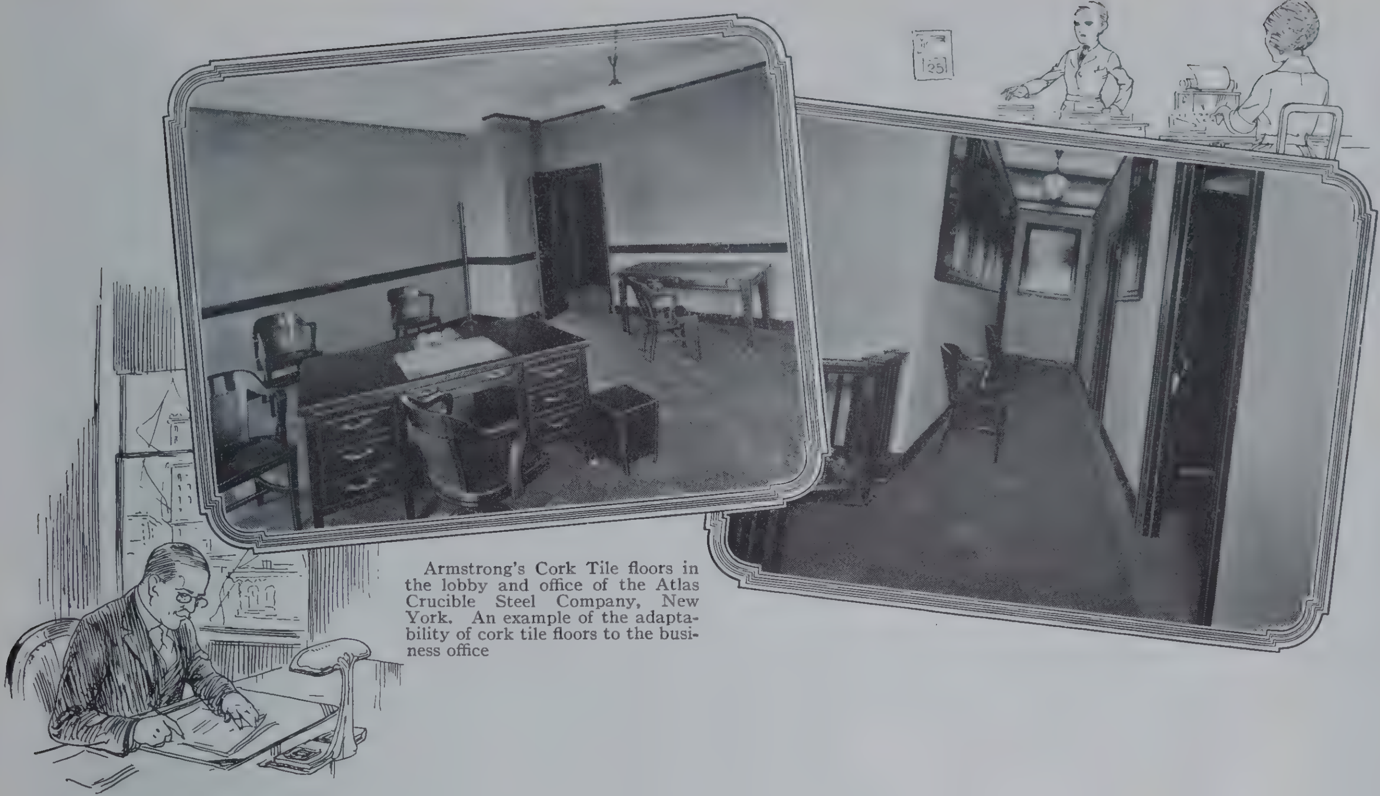
SEE OUR CATALOGUE IN SWEETS

Pp. 1202-5
Portfolio of detailed drawings mailed to architects upon request—Filing size

Andrew Hoffman Mfg. Co.

Hoffman Casement Window
900 Steger Building
Chicago





Armstrong's Cork Tile floors in the lobby and office of the Atlas Crucible Steel Company, New York. An example of the adaptability of cork tile floors to the business office

Practical as Well as Artistic

Moderate in cost, economical in maintenance, remarkably resistant to wear and abrasion, Armstrong's Cork Tile is entirely practical for the business office

Made of clean cork shavings, highly compressed, it offers a firm yet resilient surface, non-slippery and easy underfoot — a grateful relief from hard, noisy floors, and a vital factor in promoting that atmosphere of comfort and quiet so essential for efficient work.

Armstrong's Cork Tile, in three soft shades of brown, is supplied in blocks of various sizes and shapes, and in molded cove and base. With these units, floors are easily designed that are distinctive in appearance and perfectly in harmony with the decorative treatment. Moreover, the rich coloring and comfortable resilience are permanent. Refinishing and surface dressing are not needed; reasonable care will keep a floor of Armstrong's Cork Tile in the best of condition.

You will be interested in the 16-page book, "Armstrong's Cork Tile," which contains a complete description and illustrates floors in offices, stores, homes and other buildings. A copy, with a sample tile, will be mailed without charge or obligation

Armstrong Cork & Insulation Company, 132 Twenty-fourth St., Pittsburgh, Pa.

Also manufacturers of Nonpareil Corkboard Insulation for cold storage and ice storage rooms; Nonpareil High Pressure Covering for steam lines, feed water heaters, boilers, etc.; Nonpareil Insulating Brick for boiler settings, furnaces, ovens, etc.; Nonpareil Cork Covering for brine and ammonia lines, coolers, tanks and cold surfaces, generally; Nonpareil Cork Machinery Isolation for noisy machines, and Linotile for floors in offices, residences, etc.

ARMSTRONG'S CORK TILE

REGISTERED U.S. PAT. OFF.

Fireproof

Ambler Asbestos Shingles are not simply "fire-resisting"—they are absolutely fireproof!

FIREPROOF
AMBLER ASBESTOS SHINGLES

Ambler Asbestos Shingles. Made in three styles, four permanent colors: Newport gray, natural slate, red and green. Lie snug to the roof, forming water-tight and fire-tight covering.

Ambler Asbestos Building Lumber. For siding, partitions, fire doors and wherever fire resistance is essential.

Ambler Asbestos Corrugated Roofing and Siding. For industrial, railroad and farm buildings.

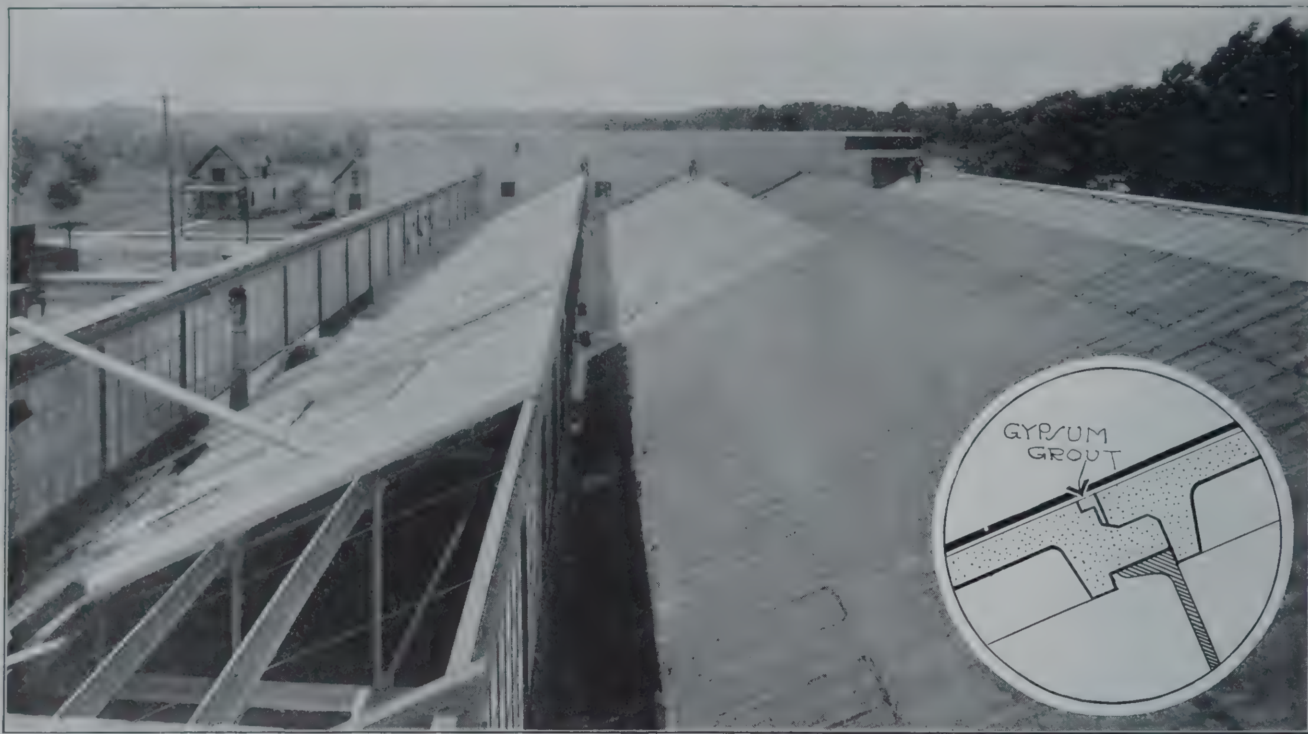
Ambler Linabestos Wallboard. Wherever a superior flame-proof, fire-resisting wallboard is wanted.

Send for Samples and Literature showing reproductions of installations

ASBESTOS
SHINGLE, SLATE & SHEATHING CO.
AMBLER, PENNA.

BRANCH OFFICES: Atlanta—Boston—Buffalo—Chicago
Cincinnati—Cleveland—Minneapolis—New York
Philadelphia—Pittsburgh—Washington

Distributors throughout the Country



Pyrobar roof deck on American Stamping Company's factory building, Battle Creek, Michigan; Architects, J. C Llewellyn and Company, Chicago, Illinois. Over 27,000 square feet of Long Span Lap Joint Pyrobar Tile used on roof

No Special Purlins Are Required

When Pyrobar Roof Tile are used for the decking, the Lap Joint illustrated in the enlarged detail provides a full bearing for the tile and is used where channel purlins have a flange width of less than 2½ inches. This enables the engineer to use smaller purlins, thereby reducing to a minimum the weight of the roof steel and the corresponding dead load to be carried by the structural members of the building.

US G PYROBAR ROOF TILE

offers the added economy of fuel saving because of its low conductivity, which prevents heat radiation through the roof. On new buildings this high insulation value permits installation of smaller heating equipment than is possible with any other type of roof decking.

Pyrobar offers other advantages in saving of time and labor and can be erected at any season of the year. Let us send you copies of our Engineering Bulletins, containing complete designing data and descriptions of the several types of Pyrobar.

UNITED STATES GYPSUM COMPANY

World's Largest Producers of Gypsum Products

General Offices: Dept.N, 205 W. Monroe Street, Chicago, Ill.

SALES OFFICES

New York, N. Y., Buffalo, N. Y., Boston, Massachusetts, Washington, D. C., Philadelphia, Pennsylvania, Pittsburgh, Pennsylvania, Cleveland, Ohio, Cincinnati, Ohio, Detroit, Mich., Milwaukee, Wis., Minneapolis, Minn., St. Louis, Mo., Kansas City, Mo., Omaha, Neb., Denver, Colo., Los Angeles, California

MINES AND MILLS

Oakfield, N. Y., Plasterco, Virginia, Cleveland, Ohio, Gypsum, Ohio, Genoa, Ohio, Detroit, Michigan, Alabaster, Mich., Grand Rapids, Mich., Milwaukee, Wis., Fort Dodge, Iowa, Blue Rapids, Kansas, Southard, Okla., Eldorado, Okla., Piedmont, S. D., Loveland, Colo., Denver, Colo., Arden, Nev., Amboy, California

Build the roofing of rock, too

THE permanence of this building's roof is definitely assured because, like the walls, the roofing is also of stone.

Layer upon layer, sheets of felted asbestos rock fibres impregnated with mineral asphalt were built up into a roofing of stone that will endure through years and years of exposure to any weather.

If you would be certain of the roof covering, specify a roofing of stone—Johns-Manville Asbestos Roofing.

Johns-Manville Asbestos Roofings are approved by Underwriters' Laboratories, Inc.

JOHNS-MANVILLE Incorporated
Madison Avenue, at 41st Street, New York City
Branches in 60 Large Cities
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto, Ont.

Detroit Fire and Marine Insurance Co., Detroit, Mich. George D. Mason, Architect.

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

Through—

Asbestos

and its allied products

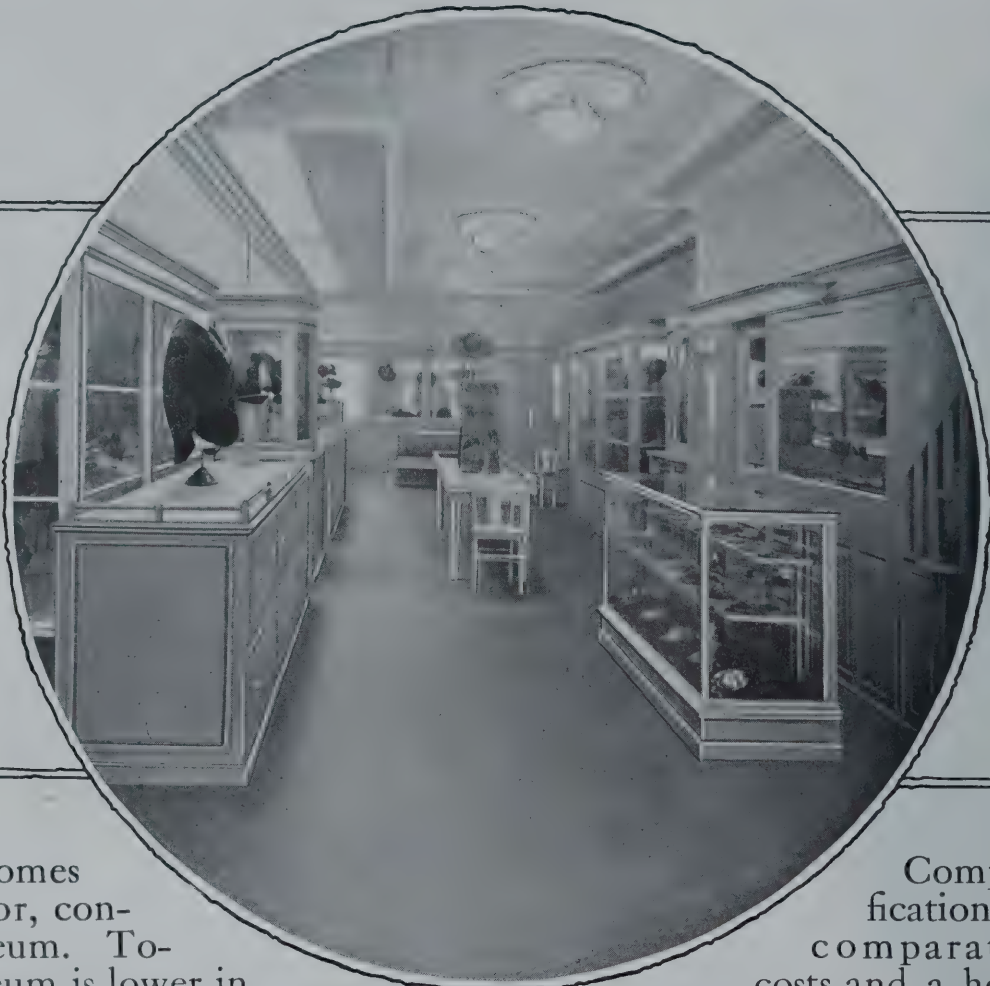
JOHNS-MANVILLE
Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

SAMPLES FILED WITH ARCHITECTS SAMPLES CORPORATION NEW YORK CITY

JOHNS-MANVILLE
ASBESTOS ROOFING

Speaking of Lower Building Costs—



The floor of Armstrong's Gray Battleship Linoleum in the Greenfield Millinery Shop, Philadelphia, Pa., blends pleasingly with the entire color scheme and makes for quietness as well as underfoot comfort. Maximum durability was assured by cementing the goods to the concrete base

When it comes to the floor, consider linoleum. To-day, linoleum is lower in first cost than many other types of floors, *and it has many distinct advantages.* It is exceedingly durable, quiet, sanitary, readily cleaned, and adapted to fire-proof construction, as it can be readily cemented to a concrete base.

Complete specifications, a table of comparative floor costs and a host of practical suggestions, including colorplates, will be found in the book, "Business Floors." A copy will be gladly sent you free on request. As a reference for color notes, floor data, etc., it is a worth-while addition to your library.

Armstrong Cork Company *Linoleum Department* **Lancaster, Pa.**

Armstrong's Linoleum

Look for the Circle "A" Trade (A) Mark on the Burlap Back

QUARTERED OAK PANELING
SALOON PASSENGERS' LOUNGE

CUNARD BUILDING, NEW YORK CITY

Benjamin Wistar Morris
Architect

Carrere & Hastings
Associated Architects

MATTHEWS BROTHERS MANUFACTURING COMPANY

ARCHITECTURAL WOODWORK

Established 1867

52 VANDERBILT AVE., NEW YORK
MILWAUKEE, WISCONSIN

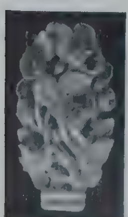

1949-Y

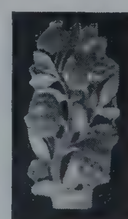

3010-Y


NUMBER 3143-Y.


3009-Y


1982-Y


G-2


G-4


1987-Y


1984-Y

WHEREVER marble, cement, plaster or tile is used in the home Rookwood fountain backs and Rookwood decorative inserts offer limitless possibilities of embellishment.

Rookwood makes many distinctive and beautiful small things for the home, such as bowls, vases and candlesticks.

Write for literature

THE ROOKWOOD POTTERY CO.

Architectural Dept. Cincinnati, Ohio


3140-Y


1879-Y

1719-Y

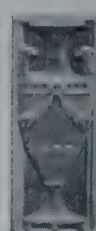


NO. Q-2

1721-Y



1950-Y


3141-Y

Gold-Seal Linoleum laid by P. W. Burnham & Co., New York.

Gold-Seal Battleship Linoleum on the floor of a private office of W. R. Grace & Co.

One of the larger offices.

An outer office, showing fabric rug on a background of Gold-Seal Battleship Linoleum.

The Modern Floor for the Modern Office

NO. 10 HANOVER SQUARE, New York City, might almost be called headquarters of America's foreign trade. For it is the home of W. R. Grace & Co., operating all over the world, wherever American goods are marketed or foreign goods obtained for American consumption.

Throughout this entire building, the floors are covered with *Gold-Seal* Battleship Linoleum —durable, sanitary, economical—from every viewpoint *the modern floor for the modern office.*

Gold-Seal Battleship Linoleum is resilient and restful to walk upon. It does away with the nerve-racking clatter of hurrying footsteps, and gives instead an atmosphere of quiet efficiency. It is attractive in appearance, whether used uncovered or as a background for fabric rugs. Its durability and ease of cleaning make it extremely economical.

Made to conform to the rigid specifications of the U. S. Navy for use on the decks of naval vessels, the *Gold-Seal* brand is *genuine battleship linoleum* of the very highest quality. As positive assurance of this high quality all *Gold-Seal* Battleship Linoleum carries the famous *Gold-Seal* Guarantee, which says *and means:* "Satisfaction Guaranteed or Your Money Back."

Gold-Seal Cork Carpet

When absolutely noiseless floors are desired, we recommend *Gold-Seal* Cork Carpet. It is springy and resilient—as quiet underfoot as a heavy woven rug. Made in 6 attractive shades. Guaranteed by the Gold-Seal Guarantee.

CONGOLEUM COMPANY
INCORPORATED

Philadelphia, New York, Chicago, Boston, San Francisco, Minneapolis, Dallas, Kansas City, Pittsburgh, Atlanta, Montreal

GOLD SEAL
Battleship Linoleum

(THE FAMOUS FARR & BAILEY BRAND)

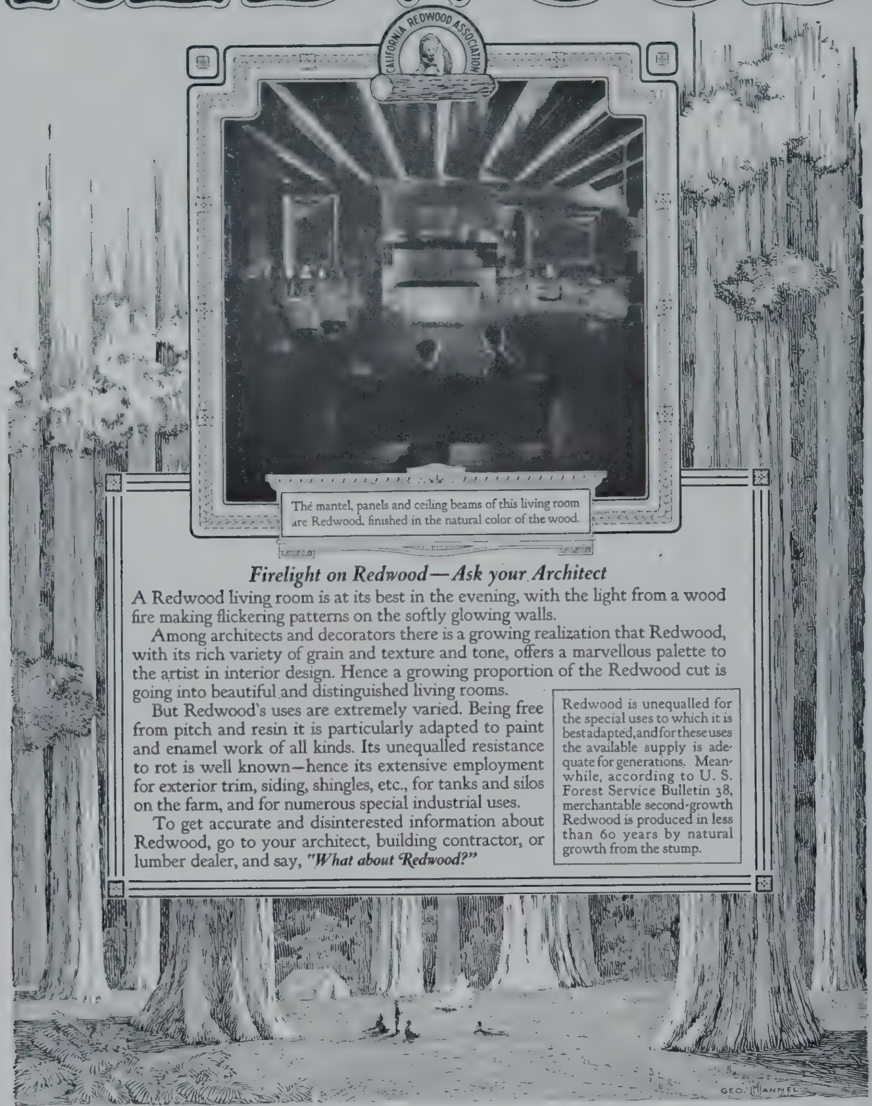
Made According to U.S. Navy Standard

IMPORTANT

For best results and maximum service, Gold-Seal Battleship Linoleum should be laid by experts. Incorrect laying may cause serious trouble. Let us send you copies of our Gold-Seal Specifications for Laying Linoleum and Cork Carpet and samples of these floorings.

GOLD SEAL LINOLEUM GUARANTEE
SATISFACTION GUARANTEED OR YOUR MONEY BACK

CALIFORNIA REDWOOD



This advertisement is appearing in the December issue of Atlantic Monthly, Century, Harper's, Scribner's, The Review of Reviews and World's Work.

THIS advertisement is written with just one purpose in mind: to send prospective home-builders to their logical technical advisers—the architect, the building contractor and the lumber dealer—with a question: "What About Redwood?" You can answer this question, and it is your opportunity to secure a client or a customer. Complete information, prices and specifications may be obtained by addressing any of the sales and distributing branches listed below.

SALES AND DISTRIBUTING BRANCHES

Redwood Sales Company (representing six producing companies*) Exposition Bldg., San Francisco, California.

John D. Mershon Lumber Company, (agent), 803 Flatiron Bldg., New York City.

A. C. Dutton Lumber Corporation, (agent), Springfield, Mass.

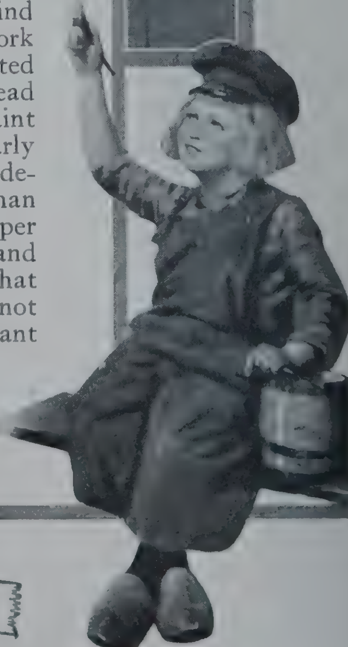
The Pacific Lumber Company, 311 California Street, San Francisco, and Central Bldg., Los Angeles, California.

The Pacific Lumber Co., of Illinois, 522 Fifth Avenue, New York City; McCormick Bldg., 322 So. Michigan Ave., Chicago, Ill.; Grand Ave., Temple Bldg., Kansas City, Mo.

Union Lumber Company, (representing two additional producing companies†), Crocker Bldg., San Francisco; Merchants National Bank Bldg., Los Angeles, California; 2850 Grand Central Terminal Bldg., New York City; McCormick Bldg., Chicago, Ill.

MEMBER COMPANIES (*San Francisco Offices*)

*Albion Lumber Company
*Dolbeer & Carson Lumber Company
†Glen Blair Redwood Company
*Hobbs, Wall & Company
*Holmes, Eureka Lumber Company
*Little River Redwood Company
†Mendocino Lumber Company
Union Lumber Company
*Northwestern Redwood Company
The Pacific Lumber Company



Arrow Adjustable Electrolier Push Switch

Three switches in one

THE Arrow Adjustable Electrolier Switch is a typical example of the refinement of modern wiring devices. It controls two or three circuits from a single outlet more conveniently than if three switches were installed in various parts of the room.

These switches take the standard push switch plates and boxes and can be furnished with radium luminous indicating handles and, if desired, in lock type.

Architect's Service Department This department has been organized to furnish a real help to architects in providing electrical wiring specifications that will include the latest and best development in the field of wiring devices.

THE ARROW ELECTRIC CO.
Hartford, Conn.

BOSTON NEW YORK SYRACUSE PITTSBURGH
CHICAGO SAN FRANCISCO BALTIMORE

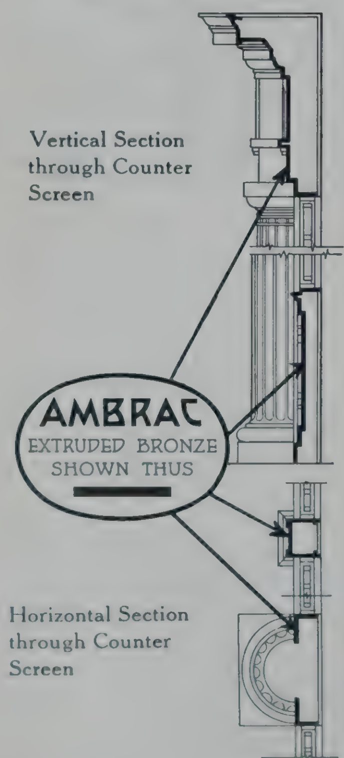
ELECTRICAL ARROW WIRING DEVICES

ARROW

The complete line of Wiring Devices

Great Falls National Bank, Great Falls, Mont. Henry Hall Johnson, Great Falls, Mont., Architect. Counter screens fabricated by J. S. Heath Co., Inc., Chicago, Ill., from AMBRAC extruded bronze shapes and mouldings manufactured by The American Brass Company

Ambrac Extruded Bronze Counter Screens and Grilles



AMBRAC extruded bronze architectural shapes are found in many of the banks and public buildings of the country. Because the bronze is forced through a die, which follows the original sectional drawing exactly, the resultant shape has the sharp lines and well-defined shadows that the architect demands. The most complicated sections are thus made of AMBRAC extruded bronze for screens, pilasters, grilles, wickets, counters, window frames and cornices.

AMBRAC bronze shapes are always extruded according to drawings submitted by architects. Hence, estimates for AMBRAC extruded shapes can be given only when drawings are sent.

The Extrusion Departments of The American Brass Company at either Ansonia, Conn., or Kenosha, Wis., will gladly supply technical information on request to architects, builders and property owners.

The American Brass Company
Waterbury, Conn.

ANSONIA BRANCH
Ansonia, Conn.

KENOSHA BRANCH
Kenosha, Wis.

SERVICE SECTION

of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

Are We Ready for a National Clearing House for Construction?

CONTRACTORS, material men and cement manufacturers are in a controversy over sales made by manufacturers directly to the contractor. Who may compose the differences on a basis compatible with the best interest of the entire construction industry and the public welfare? Organized labor and organized contracting interests fix wages in the building trades and write agreements covering working conditions as if these basic questions were the private affairs of labor and contractors, rather than matters immediately vital to those who build and those who rent. Who may rightfully step in and insist that these decisions regarding wages and agreements take proper cognizance of the rights of the entire construction industry and, therefore, be based on a proper recognition of the public's rights?

The National Association of Builders Exchanges recently issued a Code of Ethics. The Associated General Contractors of America, at their annual meeting in New Orleans last January, formulated a Code of Ethics. In this field the American Institute of Architects has been a pioneer. The professional engineers, lumber organizations and material dealers have their codes; who may take these regulations and produce a composite of thought and practice that will be recognized nationally as the Code of Ethics of the entire construction industry? These questions suggest a problem to which the evolution of any industry invariably leads—a problem which right now confronts the construction industry of the United States and which, from now on, will be increasingly insistent.

Prophetic of an ultimate solution, in which will be recognized the fact that maximum protection for a group interest is had only through maximum service in the public interest, are the current activities in behalf of closer co-operation on the part of organized groups within the construction field. Here, again, the American Institute of Architects is active; the National Association of Builders Exchanges has a committee studying the subject of closer co-operation with other national bodies. The movement for a National Construction Congress, started last year, and the work of the National Federation of Construction Industries are experiments in the synchronization and adjustment of organization machines which heretofore have been running wholly independently.

Whether or not a specific organization now fully meets the need for a national council, a heading-up organization for the construction industry, may be debatable. That some such organization is desirable—that it is imperative—may be asserted without fear of contradiction today. The National Federation of Construction Industries is an experiment in this field which has been operating long enough to afford a basis of observation. It is significant, perhaps, that the organization of this Federation was forced by war conditions.

Hastily built machines are bound to be imperfect, and it was not surprising that the National Federation, practically organized over night, functioned imperfectly in several particulars. This lack of perfection is less important than the fact that a crisis clearly indicated the need of some such machinery in the interests of both the government and the construction industry and that in the face of many obstacles a definite attempt was made to fill the need.

It is but a warranted recognition of helpful service to say that the National Federation was the only national organization which attempted a campaign to get construction costs down through voluntary action on the part of the interested factors. The fact that over 65 cities held conferences after the plan outlined by the National Federation suggests that its agitation was decidedly fruitful.

Of course this national organization has no dictatorial powers over its association members. It can be but an advisory body with no power to affect the autonomy of member organizations. Its power, in large measure, would rest in its contact with the public and in the voluntary co-operation of member organizations. The question whether organization machinery now at hand is accepted and perfected or other and new machinery must be provided, can be determined only by developments in the future. All that can be done at this time is to call attention to the pioneers in this field, to note their sincerity, courage and vision, and commend their accomplishments to the careful consideration of those who would see the construction industry 100 per cent efficient in serving itself through service to the national public.

BUILDING CODE STANDARDIZATION

ARCHITECTS who have encountered difficulties resulting from the varying requirements of building codes in different cities will be interested to know that considerable progress is being made in the establishment of national standards. At the present time Prof. Woolson of the National Board of Fire Underwriters is actively engaged with a committee appointed by Secretary Hoover to develop recommendations in this direction. The work of the National Board of Fire Underwriters tending toward the standardization of building codes has been recognized as of value to every branch of the construction industry.

The National Lumber Manufacturers' Association has recently made an exhaustive study of building codes and issues these interesting statistics as to building code activities in the various states. Any standardization or correction of building codes which will allow of minimum requirements and the free competition of all good materials and forms of construction must prove invaluable because of its effect of lessening the cost of building construction.

The committee appointed by Secretary Hoover includes two architects in its personnel, Ernest J. Russell, St. Louis, and Edwin H. Brown, Minneapolis. The other members in addition to Prof. Ira H. Woolson are: Rudolph P. Miller, Superintendent of Buildings, Manhattan; J. R. Worcester, consulting engineer, Boston; Prof. W. K. Hatt, Purdue University, and J. A. Newlin, Forest Products Laboratory.

We may note here also that architects through chapters of the American Institute of Architects and through the state associations are becoming more and more active along building code and related economic lines. In Minneapolis, for instance, the local chapter of the American Institute of Architects furnished the chairman and the driving force for putting through the excellent housing code which today serves as a model for 20 or 30 other municipalities. It has also assisted materially in securing a drastic ordinance affecting the height of buildings.

In Chicago, also, architects are actively engaged in bringing about beneficial changes in local building requirements. Similarly, in other sections of the country architects have co-operated to take a more active interest in committee affairs and in codes which affect building construction.

This is one of the most encouraging signs to the profession. It begins to recognize the value of closer co-operation and that it is possible for a group of architects to work together for the benefit of the community and the building industry.

THE FORUM INDEX

THE value of having definite information at hand to help reach intelligent decisions is recognized by many, and more or less definitely sensed by others. As observation of the methods of successful men becomes more keen, this appreciation of knowing how and where to get information will become general. Buried data is, however, as good as useless and a systematic system of indexing and using any data is absolutely necessary.

THE FORUM in the course of a year publishes an immense amount of data of vital use to the architect. To help in making this readily accessible we have given serious study to our methods of indexing the contents and an examination of the index for the second volume of 1921, published with this issue, will indicate many improvements over previous forms. We have made but two main divisions, one illustrations and the other text. Illustrations are indexed under types of buildings, kinds of detail, etc., and when a building logically comes under different classifications it is included in each. Symbols further indicate the character of presentation, whether with plans, exterior or interior views, etc. All of this is further cross-indexed under architects' names.

The text matter is similarly indexed under subdivisions with particular relation to *subject* rather than *title*, so that use of the index is simplified and will disclose all material available under a given *subject*. This index represents painstaking work and expense on our part and we trust that it will be used to a degree corresponding with the effort made in its preparation. It presupposes that architects will retain their files complete, although we appreciate that in many offices a system of loose leaf vertical filing is in use; it is, however, our hope to adjust our index to such a system as well, and on this more will be said later. We will welcome suggestions from offices that have given consideration to this subordinate but important detail.

WAGES IN THE BUILDING TRADES

THE National Federation of Construction Industries issues this tabulation of building trades wages. Where wage adjustments have not been made construction is held up. Conditions should be settled by employers and workmen and equitable adjustments made without further loss of time.

Trade	No. of cities	Avg. 1914	Avg. 1920	Avg. August, 1921
Bricklayers	19	.756	1.26	1.117
Carpenters	18	.515	1.07	.93
Cement finishers	19	.538	1.043	.92
Engineers	12	.621	1.123	1.058
Granite cutters	14	.596	.996	.97
Electricians	17	.51	1.065	.995
Elevator constructors	11	.555	1.095	1.02
Gas fitters	12	.576	1.005	1.00
Lathers	16	.573	1.12	1.00
Marble setters	16	.631	1.098	.925
Painters	16	.515	1.00	.91
Plasterers	18	.615	1.192	1.115
Plumbers	18	.605	1.104	1.029
Sheet metal workers	18	.496	.969	.951
Steam fitters	19	.562	1.10	1.04
Stone cutters	16	.58	1.095	.99
Stone masons	16	.666	1.156	1.05
Steel erectors	19	.588	1.12	1.02
Tile setters	17	.61	1.063	.98
Building laborers	17	.285	.645	.465
Hod carriers	16	.337	.805	.717
Ornamental iron workers	15	.599	1.097	1.03
Pipe coverers	10	.524	1.053	1.007
Roofers	17	.484	.953	.907

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

FINANCE

WALTER STABLER

Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER

President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN

President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

SAFETY ENGINEERING

S. J. WILLIAMS

Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN

Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM and THE BUILDERS' JOURNAL.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise in this connection.

AUTOMOTIVE BUILDINGS

HAROLD F. BLANCHARD

For years a specialist in the layout and equipment of buildings of this type. Mr. Blanchard is a mechanical engineer and has practical knowledge of special conditions in many sections of the country through personal investigation.

FIRE PROTECTION ENGINEERING

J. D. HUNTER

Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.

President, The Agricultural Engineering Company, Columbus, Ohio. Professor and Head of Department of Agricultural Engineering, Ohio State University.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

LEGAL QUESTIONS

WILLIAM L. BOWMAN

Attorney, Member of the New York Bar

Specialist in lega matters pertaining to real estate and building contracts.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	NEW ENGLAND: Portland, Me.§	Boston, Mass.	Providence, R. I.	Hartford, Conn.	New Haven	New York City	NEW YORK: Albany, N. Y.†††	Utica††	Syracuse★	Oswego	Binghampton
(1) Bulk Lime....per cwt.	....	....	....	....	....	....	....	....	....	$1.25	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$2.75	$3.20	$3.25	$4.60	....	....	....	$3.10	$3.10	3.90	$3.00
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	4.50	4.50*	4.60*	$4.50	$4.50*	$5.00*	4.65	4.60	4.75	4.50
(4) Crushed Stone....per ton	....	2.50	....	4.35	....	....	2.75	3.60	2.20	3.20	....
(5) Crushed Stone....per yd.	....	....	3.75	3.50	....	4.00*	....	....	2.64	5.25	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	.....	18.00	24.00	17.00	25.00	17.50	15.00	18.00	20.00	30.00	16.50
(7) Corner Bead, galvanized....per ft.	.05	.04	.05	.045	.05	....	.06	.05	.05	.05	.05
(9) Drain Tile, 6 in....per ft.	.15	.186	.30	.14	.125	....	.155	.129	.125	.07	.105
(10) Flue Lining, 8½ in. x 8½ in....per ft.	.30*	50%*	.36	.35	.33	....	50%*	.275	.30	.33	.33
(11) Flue Lining, 8½ in. x 13 in....per ft.	.45*	50%*	.54	.53	.495	....	50%*	.40	.45	.50	.50
(12) Fire Brick, Standard 9 in. No. 1 Clay....per M.	85.00	75.00	90 00	70.00	70.00	75.00	80.00	80.00	73.00	80.00	70.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags....per ton	......	25.00*	30.00*	25.00	21.43	15.00*	20.00	14.00	12.00	25.00	20.00
(14) Gravel, washed....per yd.	....	1.80*	2.00	2.50*	....	3.25*	2.00	....	....	....	....
(15) Hollow Building Tile (8x12x12 in.)....per M.	*	260.00	....	300.00	....	221.10	350.00*	240.25	250.00	275.00	300.00
(16) Hollow Building Tile (8x5x12 in.)....per M.	*	140.00	....	....	....	117.90	200.00	....	135.00	....	....
(17) Hydrated Lime (mason's) in 50 lb. paper bags....per bag	.50	.50	.80	.575	.55	.45	.60	.525	.60	.65	.50
(18) Hydrated Lime (finishing) in 50 lb. paper bags....per bag	....	.55	.85	.625	.60	.60	.70	.606	.70	.75*	.65
(19) Hair....per bu.	.50	.50	.55	.80*	.55	.60*	.75	.50	.50	.75	....
(20) Metal Lath, Exp., Gauge No. 24, weight 3.4 lbs.‡....per yd.	....	.2933	.38	.35	.33	.2933	.40	.33	.32	.45	....
(21) Metal Lath, Expanded, Gauge No. 25, weight 3 lbs....per yd.	....	.255	.37	.34	.32	.2260*	.38	....	.30	....	....
(22) Mortar Color, red....per lb.	....	.03	.03	.025	.03	.03	.035	.025	.05	.05	.03
(26) Partition Tile, Clay (4x12x12 in.)....per M.	....	140.00	220.00	160.00	170.00	153.50*	170.00	129.75	160.00	200.00	160.00
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.185	.24	.19	.20	....	.20	....	.16	....	.20
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)....per bbl.	3.20	3.20	3.30	3.18	3.20	2.80*	3.35	3.54	3.10	3.35	3.50
(30) Extra charge for each cloth sk....per sk.	.10	.10	.075	.075	.075	....	.10	.075	.075	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	....	75.00	....	....	....	....	...	....	50.00	75.00	....
(32) Plaster Board, ⅜ in. thick....per M. sq. ft.	....	32.50	40.00	28.00*	31.25	.23*	.28*	34.50	32.00	32.00	35.00
(33) Sand (Building)....per ton	....	1.55	....	....	....	....	....	2.50	....	....	4.00
(34) Sand (Building)....per yd.	....	2.50	2.00	1.50	....	1.80	2.00	....	....	4.00	....
(35) Sewer Pipe, single strength, off list....per cent.	30%	50%	40%	40%	45%	20%	45%	53%	60%	45%	50%
(36) Wall Coping, 9 in....per ft.	.20*	45%*	.32	.24*	.22	.32	45%	.36	.18	.22	.22
(38) Wall Plaster, neat, in paper, in 80 lb. bags....per ton	....	....	....	25.00	....	....	....	....	18.75	....	20.00
(39) Wall Plaster, neat, in cloth, 100 lb. sks, incl. sks....per ton	23.00	24.00*	24.00*	24.00*	28.00	22.00*	26.00*	20.00*	20.50*	22.50	19.00*
(40) Wall Plaster, sanded, in cloth, 100 lb., incl. sks....per ton	....	21.00*	21.00*	20.50*	21.00*	18.00*	20.50*	15.00	14.20*	22 50	17.00
(41) Wall Plaster, wood fibre, in cloth, 100 lb., incl. sks....per ton	23.00	24.00*	24.00*	24.00*	28.00	22.00*	26.00*	20.00	20.50*	25.00*	20.00
(42) Wall Ties, galvanized....per M.	....	12.60	....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
(43) Wall Plugs....per M.	....	35.00	35.00	....	30.00	30.00*	30.00	25.00	25.00	28.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	....	7.00*	9.50*	7.00*	....	8.50*	....	6.50†	7.00*	6.50*	6.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	....	3.00*	....	2.90	....	....	4.35†	2.65†	2.75*†	3.00†	3.00*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	....	2.30§*	3.50§	4.25§*	....	....	2.88§*	2.65§*	2.25	2.25§	4.25§
(47) Stucco Board, Medium wt....per M. sq. ft.	....	50.00	....	55.00*	....	70.00	....	60.00*	55.00	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	55.00	....	60.00*	....	....	....	....	60.00	....	....
LUMBER ITEMS				†				†		*	*
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	....	13.00	9.50	13.00*	11.00	12.50*	12.00	12.00*	....	12.00	12.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	....	....	....	65.00	....	....	45.00	45.00*	....	40.00	45.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	38.00	40.00*	....	45.00	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	....	38.00	35.00*	....	40.00	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	....	....	....	....	....	....	38.00	40.00	....	36.00	....
(54) 1x4 "B" Flooring....per M. Board ft.	....	....	....	60.00*	....	....	90.00	85.00*	....	62.00	....
(55) Yellow Pine Clear Finish....per M. Board ft.	. . .	....	....	80.00	....	....	90.00	90.00	....	75.00	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	60.00*	....	....	....	65.00	....	75.00	....
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	....	....	....	....	....	....	....	65.00*	....	50.00	....
(58) Cypress Finish Lumber....per M. Board ft.	....	....	....	125.00	....	....	150.00	160.00	....	160.00	....
(59) ¾x4 "B" Partition....per M. Board ft.	....	....	....	60.00	....	....	....	75.00*	....	75.00	85.00
(60) ½x4 "B" Ceiling....per M. Board ft.	....	....	....	50.00	....	....	....	60.00*	....	50.00	60.00
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	....	....	....	60.00*	....	....	58.00	60.00*	....	60.00	....
(62) Mouldings, Yellow Pine....over list	....	....	....	50%	....	....	.015	1.25	....	.015*	....
(63) Washington 16 in., 5/2 Clears....per M..	....	....	....	....	....	....	6.75	7.50	....	6.20	6.75
(64) Washington 16 in., 5/2 Clears....per sq.	....	....	....	....	....	....	5.50	6.00	....	5.10	....
(65) Canadian 6 in., 5/2 xxxxx Clears....per M.	....	....	....	7.00	....	....	....	7.50	....	6.75	7.75
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	6.00	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in. No. 1 Com. Yellow Pine Boards....per M.	....	....	....	35.00*	....	....	38.00	4.00*	....	45.00	63.00*
ADDITIONAL ITEMS											
(68) Stucco, Cement....Per Sq. Yd.	....	....	....	....	....	....	....	.60	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags....Per Bag.	....	....	.30	....	....	....	.10	....	.30	....	....
(71) Wall Board (Please Note Kind)*....Per Sq. Ft.	.0435	....	.05	.055	....	....	.04	.036	.045	.045	....

*(Above Item 49)—No lumber revisions received for this issue from this city.

§Portland, consumer prices; contractor quotations on application.

†††Albany allows 10% and 2% off to contractors if paid by 10th of month following delivery.

†Above Hartford Lumber prices means prices advancing at wholesale.

‡Above Utica lbr. items means prices at yard, add 25c per load for delivery less than 1,500 ft. and 40c per load for over 1,500 ft.

Lime, Barreled (Item No. 3)—Providence, Albany, common; 300 lb. barrel. New York City; Hartford, price for finishing lime, common, $4.30. **Hydrated** (Items 17, 18)—Oswego, per bu. of 70 lbs.

Crushed Stone (5)—New York, per 2600 lb. yd.

Flue Lining (Item 10, 11)—Boston, Albany, off list. Portland, 50% off list, 10% cash discount in 15 days.

Fire Clay (Item 13)—New York City. 100 lb. bag rate; no credit for returned cloth sacks, Boston, New York, Providence.

Gravel (14)—New York, $2.75 to $3.25. Boston, Hartford, per ton.

Hollow Building Tile (Items 15-16)—Portland, not stocked in Portland; Albany, heavy, less 10% and °%.

Hair (19)—New York, per lb.; Hartford, 4 lbs. per bu.

Metal Lath (Item 21)—New York City, Gauge 26.

Par. Tile (26 & 28)—New York, less than 2,000 ft.

Portland Cement (Item 29)—New York City, including bags.

Plaster Board (Item 32)—New York City, Albany, price for each, size 32x36x⅜ in.; Hartford, 32x36x⅜.

Wall Coping (36)—Boston, per cent. off; Hartford, 8 inch; Portland, 30% off list, 10% cash discount, in 15 days.

Wall Plaster (38, 39, 40, 41)—Returned bags, Syracuse, Utica, Providence, New Haven, 15c; Albany, Oswego, 10c each; Boston, 12c each; Hartford, 13c, come for bags; New York City, 25c. Sacks extra, Binghamton.

Wall Plugs (Item 43)—New York, chiefly hardware dealers.

Roofing, Slate Surf. (Item 45)—70 lbs., Syracuse.

Roofing, Smooth Surf. (Item 46)—55 lbs., Boston, Hartford, Albany; 3 ply, 63 lbs., Utica.

Stucco Board (Items 47, 48)—Hartford, Utica, creosoted.

(Item 49)—Hartford, Utica, spruce; New York City, Eastern spruce, $11.50 to $12.00. **(Item 50)**—Utica, 10 and 14 ft., $45.00; 16 ft., $47.00. **(Items 51, 52)**—Utica, 1x6 and 1x8 inches. **(Item 54)**—Hartford, B Flat; Utica, B & Btr.; Al-grain. **(Item 56)**—Hartford, fir; **(Item 57)**—Utica, spruce; **(Item 59-60)**—Utica, B & Btr.; **(Item 61)**—Utica, 6 in.; Hartford, 6 in. Red Cedar; **(Item 62)**—Oswego, per inch; **(Item 67)**—Binghamton, Hartford, No. 2 C.; Utica, No. 2 Com.

Wall Board; (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. NEW YORK, PENNSYLVANIA, NEW JERSEY

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

	Elmira	Rochester,	Buffalo★	Jamestown, N. Y.	Allentown, Pa.	Erie	Philadelphia	Reading	Pittsburgh	Scranton	Newark, N. J.	Paterson, N. J.
(1) Bulk Lime....per cwt.	....	....	....	....	$0.75	....	$0.55	$0.65*	$1.00	$0.80	....	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	$3.60	$3.00	$2.50	....	3.00	$3.25	.75*	....	2.75	2.80	$3.15*	$ 3.21
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	5.25	4.75	....	....	4.00	5.10	....	....	....	....	....	5.00*
(4) Crushed Stone....per ton	....	2.50	....	....	2.00	2.30	3.75	2.00	5.50*	2.75	3.35	....
(5) Crushed Stone....per yd.	2.50	2.00	....	....	....	....	....	....	....	....	4.00	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)....per M.	30.00	17.00	22.50	$25.00	17.00	23.50	20.00*	20.50	16.00	20.00	21.00	18.00
(7) Corner Bead, galvanized....per ft.	.07	.05	.05	....	.06	.04	.035	.05	.06	.06	.05	.09
(9) Drain Tile, 6 in....per ft.	....	.11	.12	....	....	.095	....	....	.12	.14	.1675	.17
(10) Flue Lining, 8½ in. x 8½ in....per ft.	.50	.30	.26	.42	.34	.27*	.36	.36	.30	.25	.30	.31
(11) Flue Lining 8½ in. x 13 in....per ft.	.65	.45	.41	.63	.52	.40*	.54	.54	.45	.36	.45	.47
(12) Fire Brick, Standard 9-in. No. 1 clay....per M.	80.00	65.00	60.00	75.00	72.00	70.00	75.00	70.00	....	65.00	69.00	....
(13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	20.00*	20.00	12.00	30.00*	18.00‡	15.00	22.00	15.00	20.00*	20.00*	17.00	1.50*
(14) Gravel, washed....per yd.	2.00*	2.75	....	....	....	3.50	2.25*	4.00*	2.00*	2.00*	4.20	....
(15) Hollow Building Tile (8x12x12 in)....per M.	220.00	230.00*	200.00	....	212.50	....	....	....	135.80	260.00	240.00	260.00
(16) Hollow Building Tile (8x5x12 in.)....per M.	....	250.00*	95.00	110.00	111.20	70.00	....	....	60.00	....	110.00	....
(17) Hydrated Lime (masons) in 50-lb. paper bags....per bag	....	.475	.45	.59	.40	.475	.40625	.60	.50	.50	.50	.45
(18) Hydrated Lime (finishing) in 50-lb. paper bags....per bag	.75	.50	.45	.59	.58	.50	.5375	.75	.55	.60	.60	.55
(19) Hair....per bu.	.65*	.75*	.48	....	.75*	.15*	.40	.50	.75*	.70*	.70	.15*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡....per yd.	.40	.37	.35	.39	.36	.37	.33	.33	.32	.31	.36	.40
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs....per yd.	....	.35	....	....	....	.30	.30	.30	.32	....	.35	.43
(22) Mortar Color, red....per lb.	.06	.05	....	.05	.035	.03	.035	.05	.0225	.06	.03	.03
(26) Partition Tile, Clay (4x12x12 in.)....per M.	150.00	110.00	100.00	....	138.00	90.00	230.00	....	72.40	140.00	140.00	150.00
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	.12	.14	.16	.17	....	.19	.19	....	....	.195	.21
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)....per bbl.	3.20	3.00	2.85	3.15	2.60	3.10	2.85	3.10	2.60	3.00	2.80	2.64
(30) Extra charge for each cloth sk....per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	.....	50.00	....	....	75.00	....	....	55.00	....	45.00	51.00	55.00
(32) Plaster Board, ⅜ in. thick....per M. sq. ft.	33.75	32.00	38.75	37.50	38.00	50.00	40.00	37.50	50.00	35.00	32.50	.25*
(33) Sand (Building)....per ton	....	....	....	....	3.50	3.50	....	3.80	2.00*	3.00	2.10	2.60
(34) Sand (Building)....per yd.	4.00*	2.50	....	....	....	3.00	2.05	....	....	3.00*	2.50	2.75
(35) Sewer Pipe, single strength, off list....per cent.	40%	45%	50%	40%	39%	55%	38%	50%	50%	50%	45%	45%
(36) Wall Coping, 9 in....per ft.	.25	.22	.22	.28	.23	.18	.248	.22	.20	.26	.22	.28
(38) Wall Plaster, neat, in paper, in 80-lb. bags....per ton	19.00	20.00	....	22.00	....	....	....	....	22.00	....	....	....
(39) Wall Plaster, neat, in cloth, 100-lb. sacks, including sacks....per ton	23.00	19.00	18.00	22.00*	25.00*	25.00	22.50*	25.00	24.00*	24.00*	22.00	25.00
(40) Wall Plaster, sanded, in cloth, 100-lb., including sacks....per ton	23.00	21.00	13.00	21.00*	22.00*	17.00*	17.50*	22.00	20.00*	17.40*	16.80*	17.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb., including sacks....per ton	23.00	19.00	18.00	22.00*	....	25.00*	22.50*	....	24.00	24.00*	....	28.00
(42) Wall Ties, galvanized....per M.	5.00*	5.00	5.00	5.00	3.50*	3.50	6.00	5.00	3.00*	....	5.00	4.00
(43) Wall Plugs....per M.	22.50	25.00	20.00	....	25.00	....	....	....	....	....	....	26.00
(44) Asphalt Shingle (*singles; †stripped)....per sq.	6.50†	6.50†	....	7.50*	7.50†	7.00*	8.00	7.00	7.00†	7.00*	7.45	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	3.00**	2.75**	....	3.25*	3.00	....	....	2.75	3.00†	3.00*	3.00*	....
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	3.00§*	3.25§*	....	2.85§	2.90	....	....	....	....	1.50*	3.15§	....
(47) Stucco Board, Medium wt....per M. sq. ft.	55.00	55.00*	55.00	....	55.00	60.00	....	50.00	55.00	50.00	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	....	55.00	55.00	68.00	70.00	65.00	55.00	60.00	55.00	....	70.00
LUMBER ITEMS					*			*	*	*		
(49) Wood Lath, No. 1 (Size 4 ft.)....per M.	12.00	....	....	13.00	11.50*	12.50	12.00	12.00	12.00	11.50	12.50*	12.50
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	46.00*	....	....	40.00	42.00	42.00	....	42.00	44.00	40.00	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	....	....	....	....	....	45.00	....	45.00	60.00	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	46.00*	....	....	40.00	42.00	45.00	....	40.00	43.00	45.00	....	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	38.00	....	....	40.00	40.00	45.00	....	40.00	43.00	40.00	....	....
(54) 1x4 "B" Flooring....per M. Board ft.	80.00*	....	....	70.00	70.00	80.00	....	60.00	65.00	70.00	....	....
(55) Yellow Pine Clear Finish....per M. Board ft.	100.00	....	....	100.00	95.00	120.00	....	90.00	100.00	95.00	....	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	....	....	....	70.00	70.00	....	....	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	50.00*	....	....	60.00	....	60.00	....	65.00	58.00	....	....	....
(58) Cypress Finish Lumber....per M. Board ft.	120.00	....	....	....	....	....	....	....	160.00	160.00	....	....
(59) ¾x4 "B" Partition....per M. Board ft.	80.00*	....	....	70.00	70.00	75.00	....	75.00	73.00	80.00	....	....
(60) ½x4 "B" Ceiling....per M. Board ft.	55.00	....	....	60.00	58.00	65.00	....	55.00	58.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	40.00*	....	....	60.00	56.00	60.00	....	....	65.00	....	....	....
(62) Mouldings, Yellow Pine....over list	1.25	....	....	1.25*	....	1.00	....	....	1.10	1.00*	....	....
(63) Washington 16 in., 5/2 Clears....per M.	7.25	....	....	6.50	7.50	7.50	....	8.00	7.00	6.50	....	....
(64) Washington 16 in., 5/2 Clears....per sq.	6.50	....	....	5.20	....	....	....	....	6.50	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	6.50*	....	....	7.50	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	6.50	....	....	6.00	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.- 10 in. 12 in., No. 1 Com. Yellow Pine Boards....per M.	46.00	....	....	....	60.00	60.00	....	60.00	60.00	....	....	....
ADDITIONAL ITEMS												
(68) Stucco, Cement....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags....Per Bag.	....	....	....	....	....	.20	....	....	....	.25	....	....
(71) Wall Board (Please Note Kind)*....Per Sq. Ft.	.042	.04	....	....	.0425	.05	....	.04	.045	....	.05	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) Means no cloth bags used.

Lime (bulk, Item No. 1)—Reading, 80 lb. bu.; (Barreled, (Item 2-3)—(2) Newark includes bbls., returned at 15c; (Item 3), finishing, returned bags, 10c; Philadelphia, per bu.; Paterson, 300 lbs.

Crushed Stone (4)—Pittsburgh, size 1 in.

Common Brick (Item 6)—Philadelphia. f. o. b. job. mfrs. retail price.

Flue Lining (Items No. 10, 11) —Erie, (10) 8x8 in., (11) 8x12 in.

Fire Clay (Item 13)—Return bags, Elmira, 15c; Jamestown, none; Pittsburgh, paper sacks, $2.00 extra per ton, in cloth sacks, with no allowance for returned sacks. Scranton, returned sks., 25c; Paterson, per bag.

Gravel (Item No. 14)—Scranton, 2400 lb. yd.; Elmira, 2500 lb. yd.; 2000 lb. ton, Reading; Philadelphia, per ton; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60.

Hollow Building Tile (Item 15-16)—Rochester, (Item 15) 4 cell; (Item 16) 6 cell.

Hair (19)—Lbs. per bu., Pittsburgh, Elmira, 4; Scranton, 7; price per lb., Erie; old stock, Rochester; Pittsburgh, fibre; Allentown Govt.; Paterson, per lb.

Plaster Board (Item 32) Paterson, price for each.

Sand (Item 34)—Elmira, 2600 lb. yd.; Pittsburgh, del. price river front, longer hauls up to $3.00. F. O. B. Float, $1.60; Scranton, per ton.

Wall Plaster (Items 39, 40, 41)—Returned sacks, 15c, Jamestown, Allentown, Scranton, Pittsburgh, Philadelphia; 20c, Erie; Newark, 15c credit for returned sacks.

Wall Ties (Item 42)—Corrugated. Allentown, Elmira; per box, Pittsburgh.

Roofing, Slate Surf. (Item 45)—70 lbs., Elmira; 75 lbs., Rochester.

Roofing, Smooth Surf. (Item 46) —55 lbs., Elmira, Rochester.

Stucco Board (Item 47)—Rochester, Sheetrock.

(Item 49)—Newark, spruce; Allentown $11.50 to $12.50. (Item 50) —Elmira, 12 ft. to 14 ft., No. 2 Com. (Item 52)—Elmira, No. 2 Com. (Item 54)—Elmira, B. & Btr. (Item 57)—Elmira, No. 2. (Item 59)—Elmira, B. & Btr. (Item 61)—Elmira, fir; (Item 62) —Jamestown, per 1½ inches; Scranton, per 100 lin. ft., moulding count; (Item 65)—Elmira, 6/2 Star, per sq.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. MIDDLE AND SOUTHERN ATLANTIC STATES

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Trenton, N. J.	Wilmington, Del.	Washington, D. C.	Baltimore, Md.	Norfolk, Va.	Richmond, Va.	Huntington, W. Va.	Fairmont, W. Va.	Wheeling	Atlanta, Ga.
(1) Bulk Lime	per cwt.	$0.60*	$0.79	$0.75	$ 0.51*	....	....	....	....	....	$1.80*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	*	2.70	2.50	2.25	$2.50	$2.15	$2.80	$2.50	$2.75	2.25
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	*	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	2.50	....	....	3.00	3.75	....	4.50	5.00	....
(5) Crushed Stone	per yd.	....	3.40	....	....	....	....	....	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	14.00	22.00	18.00	21.00*	16.00	20.00	18.00	27.00	21.00	12.35*
(7) Corner Bead, galvanized	per ft.	.06	.04	.04	.05	.05	.06	.07	.04	.05	.065
(9) Drain Tile, 6 in	per ft.	....	....	.11	.14	.12	.125	.12	.10	.09	.11
(10) Flue Lining, 8½ in. x 8½ in	per ft.	....	.36	.20	.30	.30	.30	.30	.27	.30	.45
(11) Flue Lining, 8½ in. x 13 in	per ft.	.58	.54	.30	.45	.45	.45	.45	.40	.45	.60
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	....	75.00	80.00	75.00	80.00	85.00	60.00	60.00	65.00	60.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	....	21.00	25.00*	18.00	20.00	20.00*	15.00*	14.00*	11.50*	20.00*
(14) Gravel, washed	per yd.	2.50*	2.80	2.75*	2.50	4.00	4.00	2.40	3.25	2.00*	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	210.00*	160.00	200.00	225.00*	....	....	200.00	210.00*	185.00	133.35
(16) Hollow Building Tile (8x5x12 in.)	per M.	....	85.00	100.00	....	....	....	85.00	75.00	65.00	76.00*
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.475	.45	.40	.375	20.00*	18.50*	21.00*	.375	.50	1.90*
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.65	.60	.57	.50	22.50*	23.50*	22.00*	.475	.50	2.75
(19) Hair	per bu.	.45	.42	.50	.50	.60	.50	.50	.12*	.75	1.00*
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.38	.35	.28	.355	.30	.35	.38	.34	.35	.40
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	.37	.31	.43	.305*	....	.35*	35	....	.38	.345
(22) Mortar Color, red	per lb.	.04	.04	.06	.035	.05	.04	.0275	.0265	.035	.0225
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	130.00	110.00	125.00*	180.00	150.00	115.00	100.00	82.50	79.80
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.18	.19	.155	.18	....	.20	.17	....	....	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.20	2.85	2.60	2.87	3.50	3.15	3.20	2.50	2.50	3.45
(30) Extra charge for each cloth sk	per sk.	.10	.075	.10	.07	.075	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	65.00*	40.00	....	50.00	....	60.00	32.00*	....	....	....
(32) Plaster Board, ⅜ in. thick	Per M. sq. ft.	.30*	35.00	31.25	37.00	....	40.00	35.00	35.00	35.00	....
(33) Sand (Building)	per ton	2.00	2.05	1.60	....	2.00	2.75	....	3.00	2.20	....
(34) Sand (Building)	per yd.	....	2.55	2.10	....	2.50	3.00	2.25	....	....	1.85*
(35) Sewer Pipe, single strength, off list	per cent.	50%	40%	25%	50%	50%	50%	50%	55%	55%	51%
(36) Wall Coping, 9 in	per ft.	.20	.24	.24	.26	.22	.22	.20	.20	.20	.35
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	22.00	19.50	....	....	....	24.00	22.00*	....	19.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks	per ton	....	22.50	21.00*	20.25	22.50*	23.00*	24.00*	21.00*	21.00*	25.00*
(40) Wall Plaster, sanded, in cloth 100 lb. sks., inc. sks	per ton	....	20.00	23.00*	....	22.50*	23.00*	24.00*	....	16.00	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. sks., inc. sks	per ton	....	22.50	23.00*	....	22.50*	23.00*	24.00*	21.00*	21.00*	....
(42) Wall Ties, galvanized	per M.	4.50	5.00	5.00	5.00	5.00	5.00	3.50	3.50	5.00	3.75
(43) Wall Plugs	per M.	....	25 00	28.00	25.00	....	....	20.00	....	16.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	8.00†	8.50	6.00	5.70†	....	....	6.75*	7.00*	7.25*	7.00*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.25*	3.00	3.00†*	2.60**	....	....	3.00*	2.50†*	2.60**	2.75§
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.75†	2.80	2.90§*	2.65§	....	....	2.75§	3.00§*	2.80§*	2.70§
(47) Stucco Board, Medium wt	per M. sq. ft.	....	....	75.00	....	60.00	65.00	....	55.00*	45.00	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	65.00	68.00	....	....	....	....	....	....	....	....
LUMBER ITEMS											
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	13.50*	13.00*	8.50	13.00	8.00	6.00	10.50*	....	....	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	....	40.00	40.00	....	....	....	38.00	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	55.00	....	....	....	50.00	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	42.50	....	....	....	....	38.00	....	....	....
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	....	....	....	....	....	....	....	....
(54) 1x4 "B" Flooring	per M. Board ft.	....	70.00	70.00	....	....	....	70.00	....	....	....
(55) Yellow Pine Clear Finish	per M. Board ft.	....	75.00	70.00	....	....	....	90.00	....	....	....
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	70.00	55.00	....	....	....	65.00	....	....	....
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	....	....	....	....	55.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	....	135.00	....	....	....	....	160.00	....	....	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	75.00	70.00	....	....	....	75.00	....	....	....
(60) ½x4 "B" Ceiling	per M. Board ft.	....	50.00	40.00	....	....	....	55.00	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	65.00	....	....	....	....	....	....	....	....
(62) Mouldings, Yellow Pine	over list	....	1.00	1.00	....	....	....	1.00	....	....	....
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	....	6.50*	....	....	....
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	7.50	....	....	....	....	8.00*	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	6.50	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in. 12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	....	....	....	....	58.50	....	....	....
ADDITIONAL ITEMS											
(68) Stucco, Cement	Per Sq. Yd.	....	....	....	....	....	....	....	52.00*	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags	Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags	Per Bag.	....	....	....	.25	....	....	....	.20	....	....
(71) Wall Board (Please Note Kind)*	Per Sq. Ft.	.0425	.04	.0385	.04	....	....	....	.04	.0375	.0375

*(Above item 49)—No lumber revisions received for this issue from this city.

Lime (bulk, Item No. 1)—Baltimore, per bu.; Atlanta, bbl. of 3 sacks; Trenton, 70 lb. bu. (Barreled) Trenton, not handled locally, supply from Philadelphia. **Hydrated** (Items 17, 18)—Ten lot price, Richmond, Norfolk, Huntington; Atlanta, barrel price.

Common Brick (6)—Baltimore, f. o. b. job, mfrs. ret. price. Atlanta, shale.

Fire Clay (13)—Washington, Atlanta, no credit for sacks; Wheeling, 15c credit for sacks; Fairmont, Huntington, 10c credit for sacks; bulk only, Richmond.

Gravel (14)—Ton price only. Trenton, Wheeling, Washington.

Hollow Bldg. Tile (Item 16)—Atlanta, shale, clay, $51.90; Trenton, Baltimore, Fairmont, load bearing.

Hair (19)—Bu. of 4 lb., Atlanta; Fairmont, per lb.

Metal Lath (Item 21)—Richmond, Baltimore, Gauge No. 27.

Partition Tile (26)—Baltimore, little demand.

Paving Block (31)—Huntington, culls; Trenton, known as paving brick.

Plaster Board (Item 32)—Trenton, price for each.

Sand (Items 33-34)—Atlanta, washed.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c credit, Washington, Wheeling, Huntington, Atlanta, Fairmont; sacks 14⅙c credit, Richmond; returned sacks, 10c, Norfolk.

Roofing, Slate Surf. (Item 45)—80 lb., Washington, Baltimore; 85 lb., Fairmont; Wheeling, 85 lbs.

Roofing, Smooth Surf. (Item 46)—55 lb., Washington, Fairmont; Wheeling, rolls, 55 lbs.

Stucco Board (Item 48)—Creosoted, Fairmont.

(Item 49)—Spruce, Trenton, Wilmington; Huntington, another quotes $9.00. (Item 63)—Huntington, Stars. (Item 65)—Huntington, XAXRC.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

Stucco, Magnesite (Item 69)—Fairmont, per ton.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

SOUTHERN AND SOUTHWESTERN STATES

BUILDING SUPPLIES LISTED.

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Miami, Fla.	Tampa★ Fla.	St. Petersburg	Louisville	Lexington	Memphis, Tenn.	Nashville, Tenn.	Birmingham,★ Ala.	New Orleans, La.	El Paso, Tex.	Houston
(1) Bulk Lime........per cwt.	....	....	....	$0.70	$0.93*	1.30*	$0.57*	....	$0.75	$0.625	$0.925*
(2) Barreled Lime, 180 lbs. (net) bbls........per bbl.	$3.00	2.25	$2.75	$2.35*	2.25	$2.00	2.35	....	1.88	2.00	2.75
(3) Barreled Lime, 280 lbs. (net) bbls........per bbl.	....	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone........per ton	....	....	....	....	3.00	....	....	....	....	1.50	....
(5) Crushed Stone........per yd.	2.50	6.00*	5.75	....	....	2.50*	3.15	....	....	....	3.60
(6) Common Brick, standard quality and sizes (8x2¼x3¾) per M.	25.00	18.00*	17.00	18.00	18.00	14.50	15.00	....	14.57	16.00	17.00*
(7) Corner Bead, galvanized........per ft.	.06	.05	.07	.05	.06	.06	.05	....	.07	.05	.045
(9) Drain Tile, 6 in........per ft.	....	....	....	.084	.11	.09	.14	....	.12	....	.18
(10) Flue Lining, 8½ in x 8½ in........per ft.	.30	.40	.45	.27	.35	.34	.30	....	.30	....	.44
(11) Flue Lining, 8½ in. x 13 in........per ft.	.45	.50	.55	.405	.50	.51	.45	....	.42	....	.65
(12) Fire Brick, Standard 9-in. No. 1 clay........per M.	85.00	80.00*	70.00	70.00	60.00	62.00	63.00	....	56.40	90.00*	60.00
(13) Fire Clay, in 100-lb. cloth bags, including bags........per ton	40.00*	20.00	40.00	15.00*	20.00	16.00*	23.00*	....	14.10	....	20.00*
(14) Gravel, washed........per yd.	....	....	....	....	3.25	3.25*	2.25	....	3.05	....	3.75
(15) Hollow Building Tile (8x12x12 in)........per M.	260.00	280.00	230.00	208.40	180.00	180.00	246.30*	....	220.00	240.00	211.00*
(16) Hollow Building Tile (8x5x12 in)........per M.	180.00	120.00	120.00	92.60	80.00*	90.00	109.50	....	....	90.00	95 00*
(17) Hydrated Lime (masons) in 50-lb. paper bags........per bag	.65	.50*	.75	.50	.70	.50	.50	....	.41	.60	.49*
(18) Hydrated Lime (finishing) in 50-lb. paper bags........per bag	.75	.75*	.80	.65	.70	.60	.65	....	.58	....	.49*
(19) Hair........per bu.	1.00	.75	.75	75	....	.60	.55	....	.56	....	85
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡...per yd.	.34*	.42	....	.45	.35	.31	.40	....	.38	.37	.361
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs........per yd.	.34*	.30*	....	....	.35	....	....	....	.38	.40*	....
(22) Mortar Color, red........per lb.	.05	.04	.04	.035	.03	02	.05	....	.05	.035*	.0325
(26) Partition Tile, Clay (4x12x12 in.)........per M.	....	....	150.00	104.20	96.00	120.00	123.20	....	131.60	120.00	130.00*
(28) Partition Tile, Gypsum (4x12x30 in.)........per ft.	....	....	....	....	....	....	.165	....	....	....	.165
(29) Portland Cement, 4 sacks to bbl., (excluding sks.) per bbl.	4.12	3.10	3.60	2.70	3.40	3.18	3.90	....	3.31	3.50	3.15
(30) Extra charge for each cloth sk........per sk.	.07	.10	.05	.10	.10	.10	.10	....	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)........per M.	....	....	....	....	....	....	....	....	40.40	....	....
(32) Plaster Board, ⅜ in. thick........per M. sq. ft.	55.00*	40.00*	41.00	50.00	55.00	47.50*	44.00	....	41.36	....	60.00
(33) Sand (Building)........per ton	....	....	1.00	....	3.30	....	....	....	....	1.50	....
(34) Sand (Building)........per yd.	1.50	3.50	1.40	....	3.96	2.17	3.00	....	1.88	1.75	1.50
(35) Sewer Pipe, single strength, off list........per cent.	*	....	35%	55%	45%	....	50%	....	*	....	*
(36) Wall Coping, 9 in........per ft.	....	....	....	55%	45%	.23	.20	....	.16	....	.31
(38) Wall Plaster, neat, in paper, in 80-lb. bags........per ton	....	22.00	....	....	....	....	....	....	....	16.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. sks., inc. sks........per ton	....	24.00	25.50	25.00	24.00	24.00*	27.00	....	22.36	18.00*	25.00*
(40) Wall Plaster, sanded, in cloth, 100-lb., inc. sks........per ton	....	....	....	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloth, 100-lb., inc. sks........per ton	29.00*	24.00	25.50	25.00	....	24.00*	....	....	....	18.00*	....
(42) Wall Ties, galvanized........per M.	5.00	4.00	5.00	4.00*	4.50	4.50	5.00	....	4.75	4.00*	5.25*
(43) Wall Plugs........per M.	....	....	....	30.00	....	18.50	22.50	....	....	....	30.00
(44) Asphalt Shingle (*singles; †stripped)........per sq.	10.00	7.75*	8.25†	6.25	....	7.50*	7.65*	....	7.00	....	9.00
(45) Roofing Slate Surf. (*heavy, †extra heavy)........per sq.	3.50**	3.00	3.50†	3.00†	4.00*	2.85†	3.00†*	....	3.00	4.00*	3.50**
(46) Roofing Smooth Surf. (*light, †medium, §heavy)........per sq.	....	3.25§	3.25§	3.25†	3.75§	2.85§	2.90§*	....	2.50	4.00§	3.50§*
(47) Stucco Board, Medium wt........per M. sq. ft.	....	50.00	....	60.00	....	....	....	....	....	....	....
(48) Stucco Board, Narrow Key........per M. sq. ft.	....	....	....	....	....	....	....	....	....	....	....

Item	Miami, Fla.	Tampa★ Fla.	St. Petersburg	Louisville	Lexington	Memphis, Tenn.	Nashville, Tenn.	Birmingham,★ Ala.	New Orleans, La.	El Paso, Tex.	Houston
LUMBER ITEMS					*		*				
(49) Wood Lath, No. 1 (size 4 ft.)........per M.	11.00	10.00*	9.00*	....	5.50	7.50	8.50	....	7.00	12.00*	8.50*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft........per M. Board ft.	.....	32.00	....	....	35.00	.....	37.50	.....	34.00	45.00	40.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths........per M. Board ft.	.....	60.00	....	....	45.00	....	50.00	.....	52.00	48.50	45.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths........per M. Board ft.	.....	35.00	....	....	35.00	.....	35.00	.....	40.00	40.00	35.00
(53) 1x4 No. 2 Sheathing........per M. Board ft.	.....	30.00	....	....	30.00	.....	30.00	.....	30.00	.....	25.00
(54) 1x4 "B" Flooring........per M. Board ft.	.....	55.00	....	....	55.00	.....	50.00	.....	50.00	65.00	70.00
(55) Yellow Pine Clear Finish........per M. Board ft.	.....	80.00	....	....	80.00	.....	75.00	.....	65.00	90.00	75.00
(56) 1x6 "B&Btr" Drop Siding........per M. Board ft.	.....	55.00	....	....	....	....	60.00	.....	67.00	....	60.00
(57) 1x6 No. 1 Common Drop Siding........per M Board. ft.	.....	45.00	....	....	....	.....	50.00	.....	47.00	50.00	50.00
(58) Cypress Finish Lumber........per M. Board ft.	......	150.00	....	....	150.00	.....	150.00	....	160.00	....	200.00
(59) ¾x4 "B" Partition........per M. Board ft.	.....	60.00	....	....	60.00	.....	55.00	.....	55.00*	70.00	75.00
(60) ½x4 "B" Ceiling........per M. Board ft.	.....	50.00	....	....	52.50	.....	50.00	.....	52.00	....	45.00*
(61) ½x5 Clear Rdwd. Bevel Siding........per M. Board ft.	.....	60.00	....	....	....	....	65.00	....	....	....	45.00*
(62) Mouldings, Yellow Pine........over list	....	1.25	....	....	10%	....	10%	....	....	25%	*
(63) Washington 16 in., 5/2 Clears........per M.	....	....	....	....	5.50	7.50	6.50	....	....	....	7.50
(64) Washington 16 in., 5/2 Clears........per sq.	....	....	....	....	....	....	....	....	....	....	6.75
(65) Canadian 16 in., 5/2 xxxxx Clears........per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears........per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Yellow Pine Boards...per M	.....	60.00*	....	....	....	.....	55.00	.....	56.00	55.00*	45.00*
ADDITIONAL ITEMS											
(68) Stucco, Cement........Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	.43
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags...Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags........Per Bag.	....	....	....	.15	.13*	....	....	....	....	....	.15
(71) Wall Board (Please Note Kind)*........Per Sq. Ft.	.053	.045	....	.04	.055	.042	....	....	....	.05	.046

*(Above item 49)—No lumber revisions received for this issue from this city.

Lime (Item No. 1, bulk)—Nashville, 80 lb. bu. Lexington, 70 lbs.; Houston c/L f. o. b.; Memphis, f. o. b. cars. **Barreled Lime**, (Item 2 and 3), Louisville, blue river lime. **Hydrated** (Items 17, 18)—Tampa, 40 lb. bags, Florida lime; Houston, 40 lb. bags.

Crushed Stone (Item 4-5)—Memphis, f. o. b. cars, per ton; Tampa, 1½ inch.

Common Brick (Item 6)—Tampa, Ala. and Ga. red; Houston, another quotes $21.00 L. C. L.

Fire Brick (Item 12)—Carload lots, El Paso; Tampa. $60.00 to $80.00.

Fire Clay (Item 13)—15c credit, Nashville; no credit, Louisville, Houston, Miami, Memphis.

Gravel (Item 14)—Memphis, concrete.

Hollow Building Tile (15, 16)—Houston, Interlocking tile, $117.00 per M; Lexington, f. o. b. cars; Nashville, load bearing; Houston, car loads.

Metal Lath (Item 20-21)—El Paso, Tampa, Gauge No. 27; Miami (21) Gauge 26, galvanized per sq. yd.; (Item 20)—Blk. Painted Exp. Key Lath, Gauge 27.

Mortar Color (Item 22)—El Paso, barreled lot price.

Partition Tile Clay (Items 25, 26)—Houston, mfrs. price.

Plaster Board (Item 32)—Miami, Memphis, ¼ inch; Tampa, ¼ inch, $35.00.

Sewer Pipe (Item 35)—Houston various per cent. off list; New Orleans, Miami, list.

Wall Plaster (38, 39, 40, 41)—15c sacks, El Paso, Memphis, Miami; Houston, gross ton, 15c sacks.

Wall Ties (42)—Corrugated, El Paso. Louisville, Houston.

Roofing, Slate Surf. (Item 45)—85 lbs. Miami, Nashville, Houston.

Roofing, Smooth Surf. (Item 46)—55 lbs., Nashville, Houston.

(Item 49)—Tampa, St. Petersburg, cypress; Houston, No. 1 Y. P., $7.50; No. 1 cyp. $10.00; El Paso, White Pine. **(Item 59)**—New Orleans, another quotes $60.00. **(Item 60)**—Houston, ⅝x4; **(Item 61)**—Houston, ½x6 clear Bevel Siding, Y. P. **(Item 62)**—Houston, list. **(Item 67)**—Houston, 12 inches, $60.00; 4 to 10 inches, $40.00; Tampa, $60.00 to $80.00 El Paso, price for 12 in. only.

Price and rebate on bags (Item 70)—Lexington, 8c on Cement; 13c on Plaster.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

SOUTHWESTERN AND CENTRAL STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Dallas, Tex.	Topeka, Kan.	Little Rock, Ark.	Okla. City Okla.	Cincinnati, O.	Cleveland	Columbus	Toledo	Detroit, Mich.	Evansville, Ind.
(1) Bulk Lime	per cwt.	....	....	....	$1.10	$0.95	$1.10	$0.45	$0.95	$0.85	$0.90
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	$2.75	$3.00	$2.50	2.75	2.10	3.45	2.25	....	....	2.00
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	....	....	2.00*	3.10	2.90*	3.60	2.75*	3.25	2.60	....
(5) Crushed Stone	per yd.	....	....	....	....	....	4.50	...	....	....	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	20.00	....	12.50*	17.00	18.00*	14.00	16.50	17.00	16.85	14.00
(7) Corner Bead, galvanized	per ft.	.475	....	.06	06	.06	.04	.05	.04	.03	.04
(9) Drain Tile, 6 in.	per ft.	.20	....	.15	.055*	.09	.076	.08	.082	.12	.045
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.45	....	.55	.40	.24	65%*	.20	57%*	.27	.32
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.65	....	.70	.55	.36	65%*	.30	57%*	.405	.48
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	80.00	....	70.00	70.00	54.00	50.00	60.00	47.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	1.25*	....	25.00*	18.00	.73*	12.00*	.70*	11.00	10.00	15.00
(14) Gravel, washed	per yd.	....	....	....	3.10*	2 75*	....	1.25*	3.50*	3.00	1.60
(15) Hollow Building Tile (8x12x12 in.)	per M.	211.00	....	....	....	170.00	119.00	155.80	....	186.50	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	95.00*	....	....	90.00	68.00	50.00	....	75.00	79.00	65.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.50*	....	.625	.60	.45	.37	.35	.45	.40	.60
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.50*	....	.75	.60	.49	.40	.40	.45	.45	.60
(19) Hair	per bu.	.75	....	1.00	....	.55	.75	.65	.75	.20*	.60
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.362	.40	.42	.35	.35	.33	.36	.34	.34	.32
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	....	....	....	....	....	....	....	....	....	.28
(22) Mortar Color, red	per lb.	.09*	....	.03	.0275	.025	.0215	.025	.04	.03	.025
(26) Partition Tile, Clay (4x12x12 in.)	per M.	130.00*	....	....	....	100.00	60.00	79.90	80.00	97.70	75.00
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	.1525	....	....	....	.18	.21	.15	.17	.185	....
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	3.20	3.00	3.60	3.80	3.08	2.64	2.85	3.08	3.00	2.80
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.10	.10	.10	.10	.10	.08	.07	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	....	....	....	....	....	....	....	45.00*	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	60.00	....	35.00	45.00	50.00	27.50	37.50	.30*	31.00	40.00
(33) Sand (Building)	per ton	....	....	....	2.20	2.25*	2.75	3.50	2.00	3.00	....
(34) Sand (Building)	per yd.	4.00	....	1.00*	....	2.30*	....	3.50	....	....	1.60
(35) Sewer Pipe, single strength, off list	per cent.	20%	....	....	....	55%	60%	60%	57%	50%	50%
(36) Wall Coping, 9 in.	per ft.	.30	....	.35	.37	.18	60%*	50%*	57%*	45%*	.22
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	....	....	....	18.00	21.75	18.00	17.00	....	18.75	....
(39) Wall Plaster, neat, in cloth, 100 lb. sacks, including sacks	per ton	21.00	21.00	27.00*	20.00	25.00	20.00*	....	....	19.00*	21.00
(40) Wall Plaster, sanded, in cloth, 100 lb., including sacks	per ton	....	....	....	....	....	11.50	16.00*	11.40*	13.00*	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb., including sacks	per ton	21.50	....	27.50*	20.50	25.00	20.00	....	14.00	19.00*	23.00
(42) Wall Ties galvanized	per M.	4.00	....	4.75	3.50	4.75	3.00	3.50	3.00	2.75	2.50
(43) Wall Plugs	per M.	27.50	....	25.00	30.00	....	....	....	20.00	....	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	8.50*	....	8.25*	7.00*	8.50*	5.75*	6.75†	6.50†	5.50†	5.60*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	4.00*	3.50†	3.25†	3.00†	....	2.85†	2.75†	3.00†	3.00**	2.60
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	3.50§	....	2.75§	2.50§	....	2.90§	2.10†	2.90§	2.40§*	2.40§*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	....	....	....	....	55.00	....	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	....	....	....	55.00	55.00	....	55.00	55.00	....
LUMBER ITEMS				*							
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	11.00*	10.00	9.00	....	8.75	13.00*	11.00*	12.50*	....	8.50*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft	per M. Board ft.	40.00	40.00	27.00	....	....	54.00	42.50	43.00	....	40.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	40.00	55.00	35.00	....	....	54.00*	....	....	....	50.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	35.00	40.00	27.00	....	....	47.00*	42.50	38.00	....	37.50
(53) 1x4 No. 2 Sheathing	per M. Board ft.	27.50	40.00	23.00	....	....	54.00	40.00	35.00	....	35.00
(54) 1x4 "B" Flooring	per M. Board ft.	70.00	55.00	45.00	....	....	93.00*	75.00	65.00	....	65.00
(55) Yellow Pine Clear Finish	per M. Board ft.	75.00	75.00	65.00	....	....	106.00	90.00	85.00	....	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	50.00	55.00	50.00	....	....	80.00	70.00	....	....	60.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	47.50	....	40.00	....	....	72.00	60.00	55.00	....	50.00
(58) Cypress Finish Lumber	per M. Board ft.	175.00	140.00	....	....	....	128.25	140.00	135.00	....	150.00
(59) ¾x4 "B" Partition	per M. Board ft.	50.00	....	60.00	....	....	97.50	70.00	70.00*	....	75.00
(60) ½x4 "B" Ceiling	per M. Board ft.	....	45.00	35.00	....	....	66.25*	50.00	55.00	....	50.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	....	....	....	66.25	55.00	58.00	....	60.00
(62) Mouldings, Yellow Pine	over list	25%*	25%	15%	....	....	1.50*	1.10	25%	....	25%
(63) Washington 16 in., 5/2 Clears	per M.	7.00	....	....	....	....	7.95	7.50	7.00	....	6.75
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	....	....	....	....	....	....	....	5.50
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	50.00	55.00*	....	....	....	72.00	60.00	60.00	....	50.00
ADDITIONAL ITEMS											
(68) Stucco, Cement	Per Sq. Yd.	....	....	3.00	....	....	22.00*	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags	Per Sq. Yd.	....	....	....	....	....	....	....	1.50	....	....
(70) Price and Rebate on Bags	Per Bag.	....	....	....	....	.17	....	....	.15	....	.10
(71) Wall Board (Please Note Kind)*	Per Sq. Ft	.05	.05	.04	....	....	.0275	.045	.0425*	.035	.045

*(Above item 49)—No lumber revisions received for this issue from this city.

Lime, Hydrated (Item 17, 18)—Dallas, 40 lb. bags.

Crushed Stone (4)—Columbus, f. o. b. tipple stone at quarries; Cincinnati, bowlders; Little Rock, f. o. b. cars.

Common Brick (6)—Little Rock, Cincinnati, f. o. b. cars.

Drain Tile (Item 9)—Oklahoma City, 4-inch.

Flue Lining (10, 11)—Per cent. off list, Toledo, Cleveland

Fire Clay (Item 13)—Cincinnati, Cleveland, paper; Columbus, Dallas, price per sack, 10c; single sack rate, no credit on returned sacks, Little Rock.

Gravel (14)—Columbus, tipple, per ton; Cincinnati, Okla. City, per ton; Toledo, Roofing Gravel, per ton.

Hollow Building Tile (Item 15-16)—Dallas (Item 16), Interlocking Tile, $117.00 per M.

Hair (19)—Detroit, per lb.;

Mortar Colors (Item 22) Dallas, paste.

Partition Tile, Clay (26, 28)—Dallas, mfrs. price.

Paving Block (Item 31)—Toledo No. 2 quality.

Plaster Board (Item 32)—Per sheet, 32x36 ft., ⅜ in. thick, Toledo.

Sand (33, 34)—Cincinnati (33) concrete an (34) fine; Little Rock, f. o. b. yard.

Wall Coping (36, 37)—Per cent. off list, Toledo, Detroit, Columbus, Cleveland.

Wall Plaster (39, 40, 41)—Returned sacks, 15c, Cleveland, Little Rock; sacks, 12c each, Detroit; Columbus, 80 lb. paper; Toledo, 8c sacks.

Roofing, Slate Surf. (Item 45)—80 lbs. Detroit.

Roofing, Smooth Surf. (Item 46)—55 lbs., Detroit, Evansville.

(Item 49) — Cleveland, white pine; Evansville, pine; Columbus, chestnut; Dallas, cypress; Toledo, hemlock. **(Item 51)**—Cleveland, No. 2 Commercial; **(Item 52)**—Cleveland, No. 3; **(Item 54)**—Cleveland, No. 1 C.; **(Item 59)**—Toledo, Select Com. Cypress D4S; **(Item 60)**—Cleveland, ⅝ in.; **(Item 62)**—Cleveland, per 100 inches; Dallas, white pine; **(Item 67)**—Topeka, 12-inch, $65.00.

Stucco, Cement (Item 68)—Cleveland, per ton.

Wall Board; (Item 71)—Brand of Wall Board will be furnished upon request. Toledo, 3¾c to 4¼c depending on quantity bought.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

	Unit	INDIANA Ft. Wayne††	Indianapolis	South Bend	Terre Haute	ILLINOIS Bloomington, Ill.	Chicago	Moline★	Peoria
(1) Bulk Lime	per cwt.	$0.85	$0.83	$1.75	....	....	$0.65*	$0.80	.. .
(2) Barreled Lime, 180 lbs. (net) bbls.	per bbl.	....	....	3.25	....	$2.75	2.40	1.70	$2.75
(3) Barreled Lime, 280 lbs. (net) bbls.	per bbl.	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	4.50	5.00	....	$3.00	4.00	....	....	....
(5) Crushed Stone	per yd.	....	5.63	....	....	....	2.75	3.75	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	18.00	18.50	20.00	17.00	20.00	....	18.00	14.50
(7) Corner Bead, galvanized	per ft.	.06	.05	.06	.06	.06	.04	.045	....
(9) Drain Tile, 6 in.	per ft.	.07	.12	.04	....	.09	.10	.11	.12
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.36	.65	.33	.30	.30	.24	.35	.40
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.54	1.00	.495	.40	.45	.36	.45	.50
(12) Fire Brick, Standard 9 in. No. 1 clay	per M.	70.00	65.00	55.00	60.00	75.00	70.00	70.00	50.00
(13) Fire Clay, in 100-lb. cloth bags, including bags	per ton	13.00	10.50	15.00*	15.00*	20.00*	18.00*	12.00	9.00*
(14) Gravel, washed	per yd.	2.50	....	2.15	3.00*	4.45*	2.75	3.15	....
(15) Hollow Building Tile (8x12x12 in.)	per M.	....	157.75	205.00	....	....	127.00	135.00	90.00
(16) Hollow Building Tile (5x8x12 in.)	per M.	70.00	67.50	100.00	....	75.00	59.00	65.00	49.00
(17) Hydrated Lime (masons) in 50-lb. paper bags	per bag	.60	.42	.475	.50	.60‡	.45	.45	.50
(18) Hydrated Lime (finishing) in 50-lb. paper bags	per bag	.60	.50	.525	.55	.60‡	.50	.60	.57
(19) Hair	per bu.	.80	.60	.75	....	....	.50	.70	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.44	.36	.37	.40	....	.31	.35	....
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs.	per yd.	.42	....	.32	.30	.35	.29	.34	....
(22) Mortar Color, red	per lb.	.03	.03*	.05	.04	.05	.05*	.04	.03
(26) Partition Tile, Clay (4x12x12 in.)	per M.	....	95.00	100.00*	....	....	72.00	....	72.00
(27) Partition Tile, Gypsum (3x12x30 in.)	per ft.	....	.153	....	....	....	.115	.14	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	....	.191	....	....	....	.14	.16	....
(29) Portland Cement, 4 sacks to bbl., (excluding sks.)	per bbl.	3.20	3.40	3.00	2.75	2.80	2.20	2.60	3.00
(30) Extra charge for each cloth sk.	per sk.	.10	.07	.10	.10	.10	.10	.10	.10
(31) Paving Block, vitrified (3½x4x8½ in.)	per M.	70.00	....	50.00	....	....	....	35.00	35.50*
(32) Plaster Board, ⅜-in. thick	per M. sq. ft.	50.00	40.00	35.00	35.00	35.00	30.00	40.00	50.00
(33) Sand (building)	per ton	3.00	5.00	....	....	3.50	....	....	....
(34) Sand (building)	per yd.	4.05	3.00	2.15	3.00*	4.00*	2.50	2.05	....
(35) Sewer Pipe, single strength, off list	per cent.	45%	45%	50%	60%	50%	60%	42%	32%
(36) Wall Coping, 9 in.	per ft.	.26	.25	.22	60%*	.25	.16*	.25	.25
(38) Wall Plaster, neat, in paper, in 80-lb. bags	per ton	22.50	21.25	21.00	20.00	20.00	....	19.00	....
(39) Wall Plaster, neat, in cloth, 100-lb. incl. sks.	per ton	....	23.00‡	23.00‡	23.00	23.00*	18.00*	21.00	22.70
(40) Wall Plaster, sanded, in cloth, 100-lb. incl. sks.	per ton	....	12.00‡	....	....	23.00	15.00	....	16.00
(41) Wall Plaster, wood fibre, in cloth, 100-lb. incl. sks.	per ton	23.75	22.50‡	23.00‡	23.00	23.00*	18.50*	22.00	22.70
(42) Wall Ties, galvanized	per M.	4.75	3.00	3.75	3.50	5.00	4.75	3.75	4.00
(43) Wall Plugs	per M.	30.00	25.00	25.00	....	10.00	23.00	23.00	....
(44) Asphalt Shingle (*singles; †stripped)	per sq.	7.50*	8.00	7.00†	7.50*	8.00*	6.75*	7.50	7.50*
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	3.00*	3.00*	3.00†	3.00*	3.75**	2.75	3.50*	3.25†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.55†	3.25§	2.75†	2.75§	3.50**	.....	3.25§	2.75§
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	50.00	55.00	60.00	45.00	55.00	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	40.00	....	60.00	....	....	60.00	....	....
LUMBER ITEMS									
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	8.00	11.25	12.50	10.00	12.50*	....	12.00*	14.00*
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	....	....	45.00	42.00	45.00	....	49.00	49.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	65.00	50.00	60.00	....	55.00	51.00
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	40.00	40.00	40.00	....	42.00	46.00
(53) 1x4 No. 2 Sheathing	per M. Board ft.	....	....	40.00	35.00	40.00	....	40.00	46.00
(54) 1x4 "B" Flooring	per M. Board ft.	....	....	65.00*	60.00	70.00	....	75.00	75.00
(55) Yellow Pine Clear Finish	per M. Board ft.	....	....	110.00*	80.00	85.00	....	....	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	60.00	....	....	75.00	68.00
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	60.00	50.00	65.00	....	50.00	....
(58) Cypress Finish Lumber	per M. Board ft.	....	....	150.00	....	125.00	....	140.00	150.00
(59) ¾x4 "B" Partition	per M. Board ft.	....	....	80.00	60.00	75.00	....	75.00	79.00
(60) ½x4 "B" Ceiling	per M. Board ft.	....	....	60.00	50.00	60.00	....	60.00	69.00
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	65.00	60.00	60.00	....	56.00	74.00
(62) Mouldings, Yellow Pine	over list	....	....	....	....	10%	....	*	25%
(63) Washington 16 in., 5/2 Clears	per M.	....	....	....	....	....	....	6.50	7.00
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	6.50	5.00	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	6.75	....	7.50	....	6.50	7.00
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq	....	....	7.00	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	60.00	55.00	60.00*	....	55.00	55.00
ADDITIONAL ITEMS									
(68) Stucco, Cement	Per Sq. Yd.	40.00*	....	....	....	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Including Bags	Per Sq. Yd.	55.00*	1.00*	1.05	....	....	....	....	....
(70) Price and Rebate on Bags	Per Bag.	.20	.15	.20	....	....	....	....	....
(71) Wall Board (Please Note Kind)*	Per Sq. Ft.	.045	.05	.06	....	.04	.045	....	.05

††Ft. Wayne—5% discount to contractors and manufacturers for payment on or before 10th of month following purchase, except shingles, roofing and common brick, on which regular 2% discount will be allowed.

*(Above Item 49)—No lumber revisions received for this issue from this city.

‡Means no cloth bags used.

Lime (bulk, Item 1)—Per bbl., 200 lb., Chicago.

Fire Clay (13)—Returned sacks 15c, South Bend, Bloomington; paper sacks, Chicago, Terre Haute; Peoria, bulk $7.80.

Gravel (14)—Terre Haute, 3000 lb. yd.; Bloomington, 2500 lb. yd.

Mortar Color (22)—Indianapolis, Chicago, 100 lb. lots.

Partition Tile (Item 26)—South Bend, wagon load.

Paving Block (Item 31)—Peoria, 3x4x8½ in.

Sand (33, 34)—Terre Haute, 2600 lb. yd.; Bloomington, 2500 lb yd.

Wall Coping (36)—Per cent. off list, Terre Haute; Chicago, double slant.

Wall Plaster (38, 39, 40, 41)—Returned sacks, 15c, Bloomington, Chicago.

Roofing, Slate Surf. (Item 45)—85 lbs., Bloomington.

Roofing, Smooth Surf. (Item 46)—60 lbs., Bloomington.

(**Item 49**)—Peoria, Bloomington, Moline, cypress; (**Item 54**)—South Bend "B & Btr." (**Item 55**)—South Bend, Rough. (**Item 62**)—Moline, list; (**Item 67**)—Bloomington, 6 to 10 inches, 12 inches, $65.00.

Stucco, Cement (Item 68)—Ft. Wayne, per ton.

Stucco, Magnesite (Item 69)—Ft. Wayne, per ton; Indianapolis, not including dash.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED.

NORTH CENTRAL STATES

All prices are retail,

delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Unit	Green Bay, Wis.	Milwaukee	Minneapolis St. Paul★ Minn.	Davenport, Ia.	Des Moines	Sioux City	Kansas City Mo.	St. Louis, Mo.	Lincoln, †† Neb.	Denver, Colo.
(1) Bulk Lime	per cwt.	$2.00	$1.50	$1.70*	$2.00	....	$1.30*	$1.00	$0.70	....	$0.95*
(2) Barreled Lime, 180 lbs. (net) bbls	per bbl.	....	2.00	2.50*	3.50	$2.805	2.40	2.80	2.50	$2.60	2.95*
(3) Barreled Lime, 280 lbs. (net) bbls	per bbl.	....	....	....	....	....	....	....	....	....	....
(4) Crushed Stone	per ton	2.75	2.40*	....	....	4.50	4.50	....	2.30	3.50*	....
(5) Crushed Stone	per yd.	....	....	....	3.00	....	....	....	2.83	4.73*	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)	per M.	14.00	18.00	18.00	17.50	20.00	19.50	22.00	17.00*	17.00*	14.00
(7) Corner Bead, galvanized	per ft.	.05	.05	.04	.035	.055	.045	.05	.035	.05	.05
(9) Drain Tile, 6 in.	per ft.	.08	.09	.09	.10	.10	....	.0625	.15	.10	....
(10) Flue Lining, 8½ in. x 8½ in.	per ft.	.27	.30	.32	.35	.385	.32*	.27	.27	.35	....
(11) Flue Lining, 8½ in. x 13 in.	per ft.	.405	.40	.45	.50	.55	.48*	.40	.41	.55	....
(12) Fire Brick, Standard 9 in. No. 1 Clay	per M.	55.00*	75.00	65.00	58.00	67.50	65.00*	55.00	41.00	57.50	35.00
(13) Fire Clay, in 100-lb. cloth bags, inc. bags	per ton	15.00*	20.00	12.00	15.00	17.30*	20.00*	10.00	11.00	25.00	9.50
(14) Gravel, washed	per yd.	2.40*	2.25*	2.00	2.10	2.15*	3.50	4.50	2.15*	....	2.00
(15) Hollow Building Tile (8x12x12 in.)	per M.	170.00*	150.00	165.00	....	....	130.50	....	....	....	....
(16) Hollow Building Tile (8x5x12 in.)	per M.	105.00	70.00	75.50	113.00	85.00	80.00	100.00	75.00	73.50	85.00
(17) Hydrated Lime (masons) in 50 lb. paper bags	per bag	.50	.50	.55	.60	.63	.75	.70	.50	.65	.55
(18) Hydrated Lime (finishing) in 50 lb. paper bags	per bag	.75	.60	.65	.65	.73	.85	.76	.58	.65	.75
(19) Hair	per bu.	.75	.60	1.00	.75	.60	.75	.35	.65	.75	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs.‡	per yd.	.30	.30	.32	.32	.39	.316	.35	.2933	.39	.3243
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs	per yd.	.28	.35*	.31	....	....	.2885*	.32*	.24	....	.3328*
(22) Mortar Color, red	per lb.	.05	.03	.035	.045*	.045	03	.025	.2933	.035	.0495
(26) Partition Tile, Clay (4x12x12 in.)	per M.	120.00	85.00	85.00	....	150.00	90.00	140.00	97.00	....	....
(28) Partition Tile, Gypsum (4x12x30 in.)	per ft.	*	.165	.1725	....	.17	.1275	....	.17	.165	.14
(29) Portland Cement, 4 sacks to bbl. (excluding sks.)	per bbl.	2.60	2.40	2.45	2.40	3.44	2.80	3.20	2.70	3.30	3.80
(30) Extra charge for each cloth sk.	per sk.	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(31) Paving Block, Vitrified (3½x4x8½ in.)	per M.	....	....	....	45.00	35.50	....	....	....	....	....
(32) Plaster Board, ⅜ in. thick	per M. sq. ft.	35.00	30.00	32.50	50.00	35.50	36.00	36.50	45.00	35.00	30.00
(33) Sand (Building)	per ton	2.40	2.00	....	....	1.35	2.20	....	2.05	2.00	1.60
(34) Sand (Building)	per yd.	2.00	2.00	....	1.25	1.35*	3.10	....	3.24	2.70	1.60
(35) Sewer Pipe, single strength, on list	per cent	55%*	55%*	....	....	....	40%	....	41%	23%	....
(36) Wall Coping, 9 in.	per ft.	.22	.25	.25	.25	.33	.27	.1875	.175	.35	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags	per ton	19.00	....	....	....	20.80	17.00	....	22.00	18.00	....
(39) Wall Plaster, neat, in cloth, 100 lb. sks., inc. sks.	per ton	20.00	21.00*	16.00*	21.00*	20.00*	20.00*	20.00*	24.00*	21.00	20.00
(40) Wall Plaster, sanded, in cloth, 100 lb., inc. sks.	per ton	20.00	14.50*	....	....	....	....	....	....	....	....
(41) Wall Plaster, wood fibre, in cloh, 100 lb., inc. sks.	per ton	20.00	21.00*	16.50*	....	21.00*	21.00*	....	21.00*	21.50*	....
(42) Wall Ties, galvanized	per M.	5.25	4.00	3.50	4.00	4.25	3.50	3.50	3.25	3.75	5.00
(43) Wall Plugs	per M.	....	....	....	16.50	31.00	20.00	....	....	20.00	25.00
(44) Asphalt Shingle (*singles, †stripped)	per sq.	6.60*	6.50†	6.50	8.00*	6.30†	8.00†	....	....	7.75**	10.00
(45) Roofing Slate Surf. (*heavy, †extra heavy)	per sq.	2.75**	3.50†	3.25	3.25*	2.70	....	....	....	....	3.75*
(46) Roofing Smooth Surf. (*light, †medium, §heavy)	per sq.	2.85§*	3.00§	2.75†	2.85†	2.48**	....	....	....	4.00§*	3.25*
(47) Stucco Board, Medium wt.	per M. sq. ft.	....	50.00	60.00*	55.00	45.00	....	....	....	....	....
(48) Stucco Board, Narrow Key	per M. sq. ft.	....	55.00	60.00*	60.00	49.50	....	....	....	....	60.00
LUMBER ITEMS			*		*						
(49) Wood Lath, No. 1 (size 4 ft.)	per M.	10.00	10.00	11.50*	....	9.45*	10.00	8.50	....	9 00	11.00
(50) No. 1 Yellow Pine Dimension 12 to 16 ft.	per M. Board ft.	35.00	....	47.00*	....	37.20	35.00*	44.50	....	40.00	34.00
(51) 1x10 No. 1 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	101.00	55.00	48.60	35.00*	48.50	....	45.00	37.50
(52) 1x10 No. 2 Shiplap, Y. P., all lengths	per M. Board ft.	....	....	84.00	42.00	37.80	30.00	41.00	....	40.00	....
(53) 1x4 No. 2 Sheathing	yer M. Board ft.	....	....	71.00*	40.00	36.00	30.00	35.00	....	35.00	29.00
(54) 1x4 "B" Flooring	per M. Board ft.	....	....	82.00*	95.00	73*80	....	85.00	....	70.00	85.00
(55) Yellow Pine Clear Finish	per M. Board ft.	85.00	....	105.00	99.00	85.50	100.00	87.50	....	80.00	90.00
(56) 1x6 "B&Btr" Drop Siding	per M. Board ft.	....	....	....	60.00	58.50*	50.00	65.00	....	55.00	47.50
(57) 1x6 No. 1 Common Drop Siding	per M. Board ft.	....	....	47.00*	60.00	54.00*	....	60.00	....	....	....
(58) Cypress Finish Lumber	per M. Board ft.	125.00	....	....	....	126.00	....	120.00	....	125.00	....
(59) ¾x4 "B" Partition	per M. Board ft.	....	....	59.00*	....	58.50	50.00	75.00	....	50.00	45.00
(60) ½x4 "B" Ceiling	per M. Board ft.	55.00	....	47.00*	....	49.50*	45.00	50.00	....	....	37.50
(61) ½x5 Clear Rdwd. Bevel Siding	per M. Board ft.	....	....	61.00*	....	54.00	55.00	52.50	....	60.00	62.50
(62) Mouldings, Yellow Pine	over list	60%	....	50.90	....	25%	*	*	....	....	15%
(63) Washington 16 in., 5/2 Clears	per M.	5.75	....	5.00*	....	6.75	6.50	6 50	....	5.50	4.75
(64) Washington 16 in., 5/2 Clears	per sq.	....	....	7.25	6.50	....	....	....	....	....	6.00
(65) Canadian 16 in., 5/2 xxxxx Clears	per M.	....	....	....	....	6.75*	....	....	....	....	6.00
(66) Canadian 16 in., 5/2 xxxxx Clears	per sq.	....	....	....	....	5.85*	....	....	....	....	6.00
(67) 1x6 in.-8 in.-10 in.-12 in., No. 1 Com. Yellow Pine Boards	per M.	....	....	92.00*	....	48.60	....	52.50*	....	45.00	33.00
ADDITIONAL ITEMS											
(68) Stucco, Cement	Per Sq. Yd.	....	....	....	....	.85	....	....	....	1.50	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags	Per Sq. Yd.	....	2.25	....	....	.85	....	.60	1.20	....	....
(70) Price and Rebate on Bags	Per Bag.	....	.20	....	....	.15	.20	.20	.20	.15*	....
(71) Wall Board (Please Note Kind)*	Per Sq. Ft.	.045	.045	....	.045	.045	....	.045	.055	.055	....

*(Above item 49)—No lumber revisions received for this issue from this city.

††Lincoln, all prices less 5 per cent cash 10th of month.

Lime (Item No. 1, bulk)—Per 80 lb. bu., Denver, Sioux City, hydraulic; Minneapolis and St. Paul, per 180 lbs. (Barreled, Items 2, 3) Minneapolis and St. Paul, headed; Denver, 200 and 400 lbs.

Crushed Stone (4, 5)—Lincoln, 1 in. and chips; Milwaukee, net.

Common Brick (Item 6)—St. Louis, hard common. Lincoln, Nebr., price for 1st zone, $18.00 2nd zone.

Flue Lining (10, 11)—Sioux City, f. o. b. yard.

Fire Brick (12)—Sioux City, f. o. b. yard; Green Bay, high grade.

Fire Clay (13)—Sacks not included. Des Moines, Sioux City; 5c, Green Bay.

Gravel (14)—Des Moines, 3000 lb. yard; Milwaukee, St. Louis, Green Bay, per ton.

Hollow Building Tile (Items 15-16) Green Bay, another quotes $225.00.

Metal Lath (Item 20-21)—Milwaukee, Gauge No. 27; Denver, Kansas City, Gauge No. 26; Sioux City, Gauge 27, 2.3 lbs.

Mortar Color (22)—Davenport, discount in quantities.

Partition Tile (Item 28)—Green Bay, prices quoted at time of delivery.

Sand (34)—Des Moines, 3000 lb. yd.

Sewer Pipe (35) — Milwaukee 3x12 in.; Green Bay, 3 in. to 24 in. inc.

Wall Plaster (39, 40, 41)—Returned sacks 15c, Milwaukee, St. Paul, Davenport, Des Moines, Sioux City, St. Louis, Lincoln, Kansas City.

Asphalt Shingle (Item 44)—Lincoln, Standard wt.

Roofing, Slate Surf. (Item 45)—85 lbs., Green Bay.

Roofing, Smooth Surf. (Item 46)—60 lbs., Green Bay; 55 lbs., Des Moines, Lincoln.

Stucco Board (Items 48, 49)—Minneapolis and St. Paul, $55.00 to $60.00.

(Item 49)—Minneapolis and St. Paul, No. 2, mixed; Des Moines, No. 1 fir. (Item 50)—Minneapolis and St. Paul, Pine; Sioux City, Fir; (Item 51)—Sioux City, Fir; (Item 53)—Minneapolis and St. Paul, Pine; (Item 54)—Minneapolis and St. Paul, Fir; (Item 56)—Des Moines, No. 2 Clear Fir; (Item 57)—Minneapolis and St. Paul, No. 2 Clear Fir; Des Moines, No. 3 Clear Fir; (Item 59)—Minneapolis and St. Paul, No. 2 Clear Fir Joint; (Item 60)—Minneapolis and St. Paul, ⅝x4, No. 2 Clear Fir; Des Moines, No. 2 Clear Fir, 4 and 6 inches; (Item 61) — Minneapolis and St. Paul, Red Cedar. (Item 62)—Kansas City, Sioux City, list; (Item 63)—Minneapolis and St. Paul, 6 to 12 inches. Ex*A* Red Cedar; (Items 65 and 66)—Des Moines, Premium Shingle. (Item 67)—Minneapolis and St. Paul, 8 in., $96.00; 10-in., $101.00; 12-in., $106.00; Kansas City, 6 in. to 10 in., $42.50. 12 in. $53.50.

Price and rebate on bags (Item 69) Lincoln, Cement 10c, Plaster, 15c.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

RETAIL PRICE QUOTATIONS — Published by special arrangement with *Building Supply News*, Chicago

BUILDING SUPPLIES LISTED. WESTERN AND PACIFIC STATES CANADA

All prices are retail, delivered-on-the-job, unless otherwise noted.

An asterisk (*) after a figure, refers to note below.

A star (★) after city name, denotes no revisions received.

Item	Butte, Mont.	Cheyenne, Wyo.	Los Angeles, Calif.	San Diego	San Francisco	Portland, Ore.	Seattle, Wash.	Winnipeg Man.	Toronto, Ont.	Halifax N. S.	Quebec★
(1) Bulk Lime....per cwt.	$0.90*	....	$1.00	$1.25	....	*	....	$0.58*	$0.825	$0.75	....
(2) Barreled Lime, 180 lbs. (net) bbls....per bbl.	....	$3.50	2.75	2..0*	2.65	$3.50	$3.75	3.55	....	3.40*	3.00
(3) Barreled Lime, 280 lbs. (net) bbls....per bbl.	....	....	....	....	....	....	....	....	....	5.65*	....
(4) Crushed Stone....per ton	....	....	....	2.12	....	....	....	....	2.445*	.15*	2.50
(5) Crushed Stone....per yd.	....	1.75*	....	....	....	....	....	4.35	2.1875*	3.30	....
(6) Common Brick, standard quality and sizes (8x2¼x3¾)..per M.	21.00	22.00*	....	19.00	18.00	17.50	17.00*	19.00	18.00	20.00	16.50*
(7) Corner Bead, galvanized....per ft.	....	.05	.05	.06	.035	.05	.06	.04	....	.045	.05
(9) Drain Tile, 6 in....per ft.	....	....	.0975*	.14	.065	.08	.10*	.15	.11	....	.115
(10) Flue Lining, 8½ in. x 8½ in....per ft.	....	....	.3375	.50	.38	.45	.40	.55	.315	.35	....
(11) Flue Lining, 8½ in. x 13 in....per ft.	....	....	.4875	.72	.55	.65	.60	.75	.45	.55	....
(12) Fire Brick, Standard 9 in. No. 1 clay....per M.	80.00	.....	.....	70.00	70.00	85.00	80.00	85.00	80.00	90.00	74.50
(13) Fire Clay, in 100-lb. cloth bags, including bags....per ton	20.00	25.00	12.50	30.00*	20.00	20.00	24.00	35.00	22.00	22.00*	22.50
(14) Gravel, washed....per yd.	3.00	....	....	2.78	1.25	1.35*	....	3.15	1.35	3.65*	1.75
(15) Hollow Building Tile (8x12x12 in.)....per M.	15.00*	....	....	235.00	....	180.00	....	280.00	....	....	....
(16) Hollow Building Tile (8x5x12 in)....per M.	15.00*	....	100.00*	120.00	112.00	95.00	110.00	105.00	....	....	....
(17) Hydrated Lime (masons) in 50 lb paper bags....per bag	1.25	.70*	1.00*	.85	1.10*	.6375	....	.60	.5563	.75	.67
(18) Hydrated Lime (finishing) in 50 lb. paper bags....per bag	....	....	.65	.90	....	.6375	24 00	.60	.5813	.80	....
(19) Hair....per bu.	.75	....	.60	.60*	....	....	....	1.00	2.50*	....	....
(20) Metal Lath, Expanded, Gauge No. 24, wt. 3.4 lbs ‡....per yd.	....	.42	.35	.36	.3575	.40	.39	.315	....	.30	.30*
(21) Metal Lath, Expanded, Gauge No. 25, wt. 3 lbs....per yd.	....	.38	.3175	....	.3175	.36	....	....	....	....	....
(22) Mortar Color, red....per lb.	.06	.07	.07	.05	.075	.09	.08	.09	.0275	.10	.10
(26) Partition Tile, Clay (4x12x12 in.)....per. M	....	....	103.00*	140.00	....	105.00	120.00	203.00	85.00	.20*	....
(28) Partition Tile, Gypsum (4x12x30 in.)....per ft.	....	....	....	....	....	....	....	.165	....	....	....
(29) *Portland Cement, 4 sacks to bbl., (excluding sks.)..per bbl.	3.70	4.40	3.41*	3.92	3.35	3.45	3.65	4.00	4.20	4.40	4.28
(30) Extra charge for each cloth sk....per sk.	.10	.10	.15	.12	.15	.15	.05	.20	.20	.20	.20
(31) Paving Block, vitrified (3½x4x8½ in.)....per M.	....	....	....	55.00	....	60.00	48.00	....	....	....	....
(32) Plaster Board ⅜ in. thick....per M. sq. ft.	65.00	65.00*	....	50.00	....	50.00	.35*	51.00	35.00	37.50	46.00
(33) Sand (building)....per ton	....	....	....	1.63	....	1.35	....	....	1.40*	2.50	2.15
(34) Sand (building)....per yd.	2.50	1.50	....	....	....	1.35	1.50	3.15	3.50	3.75	....
(35) Sewer Pipe, single strength, off list....per cent.	....	....	....	10%	....	20%	....	.35*	40%	....	20%
(36) Wall Coping, 9 in....per ft.	....	....	....	....	....	....	.20	.35	.36	....	....
(38) Wall Plaster, neat, in paper, in 80 lb. bags....per ton	....	22.00	....	....	....	....	....	24.50	18.50	19.00	28.00
(39) Wall Plaster, neat, in cloth, 100 lb. incl. sks....per ton	22.00	....	24.00*	26.00*	23.50*	22.00	23.00*	26.00*	22.50	22.00	....
(40) Wall Plaster, sanded, in cloth, 100 lb. incl. sks....per ton	....	....	....	....	....	....	....	....	14.00	....	....
(41) Wall Plaster, wood fibre, in cloth, 100 lb. incl. sks....per ton	21.00	....	....	....	....	....	23.00*	26.00*	12.50*	3.15*‡	....
(42) Wall Ties, galvanized....per M.	....	....	11.50	7.00	6.30	6.00	....	5.00*	....	7.00	4.00
(43) Wall Plugs....per M.	....	....	....	26.00	26.00	30.00	22.50	23.00	....	20.00	....
(44) Asphalt Shingle (*singles; †stripped)....per sq.	....	....	....	....	....	12.00	....	10.50	6.25*	10.50	7.50
(45) Roofing Slate Surf. (*heavy, †extra heavy)....per sq.	....	....	3.50**	3.25†*	4.50**	3.25*	3.50**	5.10†*	3.25*	4.90†	3.90†
(46) Roofing Smooth Surf. (*light, †medium, §heavy)....per sq.	....	3.75§	3.75§*	3.75§*	3.50§*	3.60§*	3.20§*	4.00§*	3.60§*	4.90§*	3.75§
(47) Stucco Board, Medium wt....per M. sq. ft.	....	....	....	....	46.00*	....	45.00	65.00	....	....	....
(48) Stucco Board, Narrow Key....per M. sq. ft.	....	....	....	....	....	....	....	....	....	....	....
LUMBER ITEMS				†	*	†		†			
(49) Wood Lath, No. 1 (size 4 ft.)....per M.	9.00*	12.00	15.00	12.50	10.00	5.50*	7.50	11.00*	....	8.00	....
(50) No. 1 Yellow Pine Dimension 12 to 16 ft....per M. Board ft.	30.00	35.00*	....	37.00	20.00*	20.00*	18.00*	....	....	....	....
(51) 1x10 No. 1 Shiplap, Y. P., all lengths....per M. Board ft.	45.00*	42.50*	....	44.00	55.00*	20.00	18.00*	....	....	....	....
(52) 1x10 No. 2 Shiplap, Y. P., all lengths....per M. Board ft.	35.00*	....	....	39.00	....	14.00*	14.00*	....	....	....	....
(53) 1x4 No. 2 Sheathing....per M. Board ft.	40.00	30.00*	....	29.00	25.00	11.00	13.00	....	....	....	....
(54) 1x4 "B" Flooring....per M. Board ft.	75.00*	55.00*	....	81.00	70.00	35.00*	45.00*	....	....	....	....
(55) Yellow Pine Clear Finish....per M. Board ft.	100.00	100.00	....	100.00	....	55.00*	70.00*	....	....	....	....
(56) 1x6 "B&Btr" Drop Siding....per M. Board ft.	50.00	55.00	....	68.00	....	35.00*	40.00	....	....	....	....
57) 1x6 No. 1 Common Drop Siding....per M. Board ft.	40.00	....	....	....	....	25.00	....	....	....	....	....
58) Cypress Finish Lumber....per M. Board ft.	....	....	....	....	....	....	....	....	....	....	....
(59) ¾x4 "B" Partition....per M. Board ft.	85.00	55.00	....	65.00	....	35.00*	40.00	....	....	....	....
(60) ½x4 "B" Ceiling....per M. Board ft.	50.00	45.00	....	59.00	....	....	38.00	....	....	....	....
(61) ½x5 Clear Rdwd. Bevel Siding....per M. Board ft.	50.00*	75.00	....	48.50	....	....	54.00*	....	....	....	....
(62) Mouldings, Yellow Pine....over list	*	....	....	....	....	25%	*	....	....	....	....
(63) Washington 16 in., 5/2 Clears....per M..	5.00	5.50	....	6.00*	4.40	3.50	4.50	....	....	....	....
(64) Washington 16 in., 5/2 Clears....per sq	4.00*	....	....	....	4.90	....	....	....	....	....	....
(65) Canadian 16 in., 5/2 xxxxx Clears....per M.	....	....	....	....	....	....	....	....	....	....	....
(66) Canadian 16 in., 5/2 xxxxx Clears....per sq.	....	....	....	....	....	....	....	....	....	....	....
(67) 1x6 in.-8 in.-10 in.-12 in. No..1 Com. Yellow Pine Boards per M.	45.00	....	....	38.00	....	25.00*	18.00*	....	....	....	....
ADDITIONAL ITEMS											
(68) Stucco, Cement....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(69) Stucco, Magnesite (Note Brand) Not Incl. Bags....Per Sq. Yd.	....	....	....	....	....	....	....	....	....	....	....
(70) Price and Rebate on Bags....Per Bag.	....	....	....	....	....	....	....	....	....	....	....
(71) Wall Board (Please Note Kind)*....Per Sq. Ft.	.045	.05	....	.065	.0525	.05	.055	....	....	....	....

*(Above item 49)—No lumber revisions received for this issue from this city.

(‡) means no cloth bags used.

(†) above San Diego lbr. prices means all items are Oregon Pine.

(†) above Winnipeg lbr. prices means 15 per cent off.

(†) above Portland lbr. prices means all items are Fir.

Lime (Item No. 1, bulk)—Per 70 lb. bu., Winnipeg; Portland, price on dock. Butte, per bu. (**Barreled**, Items 2, 3), per 200 lb. bbls., San Diego; Halifax, 200 and 400 lbs. **Hydrated** (Items 17, 18) Ton rate, Portland; Portland, 15c Los Angeles, Tiger Brand; fine; San Francisco, per 80 lbs.; Cheyenne, 40 lb. paper bags.

Crushed Stone (Items 4, 5)—Toronto, car lot prices. (Item 4), under 2 in. (Item 5), 2 in. and over. Halifax, per bu. Cheyenne, gravel & sand mixed.

Common Brick (Item 6)—Quebec, another quotes $16.00; Seattle, Cheyenne, f. o. b., Job.

Drain Tile (Item 9)—Seattle, clay; Los Angeles, f.o.b. factory, cartage extra.

Fire Clay (Item 13)—San Diego, returned sacks, 8c; 15c, Halifax.

Gravel (Item 14)—Portland, price on dock; Halifax, cu. yd.

Hollow Building Tile (Item 15, 16) — Los Angeles, 5½x8x11½ (Heath); Butte, per ton at yard.

Hair (19)—Rope fibre used in San Diego, per pkg.; Toronto, per 24 lb. bag.

Metal Lath (Item 21)—Quebec, galvanized.

Partition Tile, Clay (Item 26)—Per sq. ft., Halifax; Los Angeles, f.o.b. factory, cartage extra.

Portland Cement (Item 29)—Los Angeles, L. C. L. Delivered.

Plaster Board (Item 32)—Cheyenne, sheetrock; Seattle, per yd.

Sand (Item 33)—Toronto, car lots on track.

Sewer Pipe (Item 35)—Winnipeg, price for 4 in.

Wall Plaster (Items 38, 39, 40, 41)—Sacks, 15c, Winnipeg, San Francisco; sacks, 20c, Halifax; sacks, 12c, Los Angeles, San Diego; (Item 41), per bbl., Toronto, Seattle, including sks., 10c each.

Wall Ties (Item 42)—Winnipeg, corrugated.

Roofing Slate Surf. (Item 45)—Los Angeles, 80 lbs.; Seattle, San Francisco, 95 lbs.; San Diego, 55 lbs.; 80 lbs., Winnipeg.

Roofing Smooth Surf. (Item 46)—Toronto, Everlastic; Seattle, Los Angeles, San Diego, San Francisco, Winnipeg, 55 lbs.; 80 lbs., Halifax; Portland, best grade.

Stucco Board (Item 47)—San Francisco, button lath, ⅜ in. thick.

(Item 49)—Portland, fir: Butte, pine; Winnipeg, 15%. **(Items 50, 51, 52)**—Cheyenne, San Francisco, (50) fir; (51) Seattle, fir; Butte, San Francisco, No. 2; (52) Portland, Butte, No. 3 Shiplap; **(Item 53)**—Cheyenne, White Pine. **(Item 54)**—Portland, fir; Seattle, S. G. Fir; Cheyenne, $60.00 & $80.00 fir; Butte, V. G. Coast Fir. **(Item 55)**—Seattle, Portland, fir. **(Item 56)**—Portland, fir; **(Item 59)**—Portland, fir. **(Item 61)**—Seattle, cedar; Butte, cedar; **(Item 62)**—Seattle, Butte, list; **(Item 63)** San Diego, 16 in. *A* 6/2; **(Item 64)**—Butte, 6/2; **(Item 67)**—Portland, Seattle, fir.

Wall Board (Item 71)—Brand of Wall Board will be furnished upon request.

Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

ASBESTOS PRODUCTS

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
Ambler Asbestos Shingles. Catalog. 5½ x 8½ in. 40 pp. Illustrated.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 36 pp. Illustrated. Standard Purlin Spacing Tables.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.
Engineers' Data Sheets. Catalog. 8½ x 11 in. 40 pp. Illustrated. Specifications and working sheets for Ambler Asbestos Corrugated Roofing and Siding.

Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Johns-Manville Asbestos Wood. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data. List of uses for asbestos wood.

ASH HOISTS—ELECTRIC AND HAND POWER

Gillis & Geoghegan, 541 West Broadway, New York, N. Y.
General Catalog. 8½ x 11 in. 20 pp. Fully illustrated. Contains specifications in two forms (with manufacturer's name and without). Detail ¼" scale for each telescopic model and special material-handling section.
The Man-Saving Load Lifter. 5⅞ x 8⅞ in. 8 pp. Illustrated. Describes G&G Telescopic and Non-Telescopic Hoists for handling material in factories.

BALANCES, SASH

Caldwell Mfg. Company, The, Rochester, N. Y.
Suggestion for the present-day Architect. Booklet. 6 x 9 in. 16 pp. Illustrated. Gives full-size dimensions and information for the purpose of writing specifications for Caldwell Sash Balances.

BOILERS—See Heating Equipment

BRICK

American Face Brick Association, 1151 Westminster Bldg., Chicago, Ill.
The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.
The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect. Price 50c.
A Manual of Face-Brick Construction. Booklet. 8½ x 11 in. Textbook on construction of the brick wall and various uses of face brick. 31 colored plates of brick houses with plans. Price, $1.00.

Common Brick Manufacturers Association of America, 1309 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available. Price $1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 72 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

BUILDING STONE—See Stone, Building

CAFETERIA EQUIPMENT

Albert Pick & Company, 208 West Randolph St., Chicago, Ill.
Equipment for Restaurants, Cafeterias and Lunch Rooms. (Book BH11.) 16¼ x 11 in. Illustrated. 86 pp. Shows practically everything required for the modern eating-place, with articles on the planning of cafeterias and other types of eating-places.
School Cafeterias. (Book BH131.) 16¼ x 11 in. 44 pp. Illustrated. Deals with the principle and practice of school feeding, including the co-ordination of domestic science room with the school eating-place. Numerous floor plans of representative installations.

CEMENT

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.
Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Pyrobar Gypsum Tile. Booklet. 8½ x 11 in. 32 pp. Illustrated. Details and specifications for fireproof partitions.
Bulletins, 8½ x 11 in., containing details and specifications for Pyrobar voids for use with reinforced concrete joist floor construction; Pyrobar roof tile; and monolithic gypsum floors and roofs.

DECORATIVE FABRICS

M. H. Rogers, Inc., 912 Broadway, New York, N. Y.
Samples of the following materials will be sent to architects upon request, to meet specific requirements:
Tapestries, velours, damasks, armures, cretonnes, tapestry panels, needlepoints, chair and sofa seats and backs.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.
Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.
Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Frink, I. P., Inc., 24th Street and 10th Avenue, New York, N. Y.
Catalog 415. 8½ x 11 in. 46 pp. Photographs and scaled cross sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

Kohler Co., Kohler, Wis.
Kohler Automatic Power and Light 110 Volt D. C. Booklet. 5 x 7 in. 32 pp. Illustrated. Describes a standard voltage automatic, electric power and light plant for isolated homes.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.
Simplex Manual Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Smyser-Royer Co., 1609 Sansom St., Philadelphia, Pa.
Exterior Lighting Fixtures. Catalog F. 8½ x 11½ in. Illustrated. Illustrates lamp standards, brackets, lanterns and pier lights, for exterior use.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 264. 8¼ x 10⅞ in. 54 pp. Illustrated. Gives description with diagrams of various types of motors, generators, generating sets, propeller fans, air heaters, and apparatus for special application.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.
Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.
Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.
Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.
Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 130 West 34th St., New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs and brief descriptions.

Anchor Post Iron Works, 165 Broadway, New York, N. Y.
Catalog 51. 8½ x 11 in. 53 pp. Illustrated. Anchor Post Fences for Country Place, Factory or Farm.
Catalog 54. 8½ x 11 in. 24 pp. Illustrated. Factory Fences.

FIRE DOORS—See Doors, Windows and Trim, Metal

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 64*

FIREPLACE EQUIPMENT

Covert Co., H. W., 137 E. 46th Street, New York, N. Y.
Hints on Fireplace Construction. Catalog. 5⅜ x 8½ in. 11 pp. Illustrated.
Diagrams of construction and installation of Covert "Improved" and "Old Style" Dampers and Smoke Chambers.

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
Armstrong's Cork Tile. Booklet. 5 x 7 in. 16 pp. Illustrated in color.
Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
Speaking of Floors. Booklet. 11¼ x 15 in. 16 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1921. Catalog. 3½ x 6 in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book Three books. 3½ x 5¾ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.
Carter Bloxonend Flooring Co., 1303 R. A. Long Bldg., Kansas City, Mo.
Blox-on-end Flooring. Catalog. 3¼ x 6¼ in. 20 pp. Illustrated. Describing Blox-on-end Flooring and its adaptability to concrete, wood or steel construction; also various methods of installation.
Specification Sheet. 8½ x 11 in. 4 pp. Illustrated. Standard specifications in convenient form for architects and engineers as recommended by the American Institute of Architects.
Congoleum Company, Inc. (Linoleum Dept.), Philadelphia, Pa.
"Specifications for Laying Linoleum and Cork Carpet, according to the Congoleum Company's new method compiled after years of careful research."
Linoleum Service Sheet. Gives complete printed specifications as well as detail drawings showing application in specific cases such as thresholds, staircases, under radiators, etc.
Installation and Care of Battleship Linoleum. Booklet. 6 x 9 in. 24 pp. Illustrated. Instructions as to the uses of Battleship Linoleum, its laying and care.
Pocket Pattern Book. Descriptive Booklet. 3½ x 8½ in. 64 pp. Illustrated. Shows full color reproductions of every grade and color of Linoleum, Inlaid Linoleum, Cork Carpet and also all patterns of the Gold-Seal Line.
The Marbleloid Co., 461 Eighth Ave., New York, N. Y.
The Universal Flooring for Modern Buildings. Booklet. 6¾ x 9¾ in. 32 pp. Illustrated. Describes uses and contains specifications for Marbleloid flooring, base, wainscoting, etc.
Marbleloid Flooring for Hospitals. Bulletin. 8½ x 11 in. 4 pp. Illustrated. Describes the especial features of this composition floor for hospital buildings.
Marbleloid Specifications. Booklet. 8½ x 11 in. 4 pp. Illustrated.
Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.
Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.
Modern Oak Floors. Booklet. 6¼ x 9¼ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
Oak Flooring, How and When to Use it. Booklet. 3½ x 6¼ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thickness and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

General Chemical Company, The, 25 Broad Street, New York, N. Y.
Hard-N-Tyte for concrete and mortars. Booklet. 3½ x 8½ in. 8 pp. Illustrated. Describes use of Hard-N-Tyte as application for hardening concrete floors.
The Hard-n-tyte Specification. Booklet. 8½ x 11 in. 4 pp. Gives exact specifications for concrete floor finish.
Making poor concrete floors good and good ones better. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describes effects of Hard-n-tyte on concrete floors, with photographs and data.
Sonneborn Sons, Inc., L., 266 Pearl Street, New York.
Concrete and Lapidolith. Booklet. 5¾ x 8⅜ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolize? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

FURNACES—See Heating Equipment

FURNITURE

Estey Organ Company, Brattleboro, Vt.
Pipe Organs. Complete specifications and full information furnished to the architect for pipe organ to be installed in any given residence, upon receipt of plans and other particulars.
Hampton Shops, 18 East 50th St., New York, N. Y.
Glimpses from Hampton Exhibits. Brochure. 16 pp. 5 x 7½ in. Illustrated. Shows examples of Hampton work and gives one an idea of their resources. Of interest to the client as well as to the architect.
Albert Pick & Company, 208 West Randolph St., Chicago, Ill.
Hotel, Apartment Hotel and Institution Installations. (Book BH120.) 16¼ x 11 in. Illustrated. 160 pp. Pictures and describes Hotel, Apartment Hotel, Club and Institution Installations with many photographs of representative establishments, showing equipment and furnishings in detail. Valuable to architects.
The "White" Door Bed and Space-Saving Devices. Booklet. 16¾ x 11 in. Illustrated. 34 pp. Consists almost exclusively of photographs, floor plans and diagrams, showing door beds, dressing cabinets, kitchen cabinets and other space-saving devices to increase rental values and augment living comfort.

GLASS CONSTRUCTION

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3⅝ x 8½ in. 32 pp Illustrated. Covers the complete line.

GRANITE—See Stone, Building

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.
McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.
Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
Ball Bearing Butts. Booklet. B8. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.
Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 12F 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American District Steam Company, North Tonawanda, N. Y.
Bulletin No. 150-AF. 6 x 9 in. 32 pp. Illustrated. Describes the Adsco System of Atmospheric Steam Heating and explains how it saves 20 to 30% of fuel cost. Tells how to figure radiation.
Catalog No. 21-AF. 6 x 9 in. 200 pp. Illustrated. Lists and describes the full line of equipment and devices manufactured for use on underground and interior steam mains, expansion joints, steam meters, condensation meters, traps, flange fittings, angle fittings, manhole curbs, alignment guides, etc.
James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam. Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.
Excelso Specialty Works, 119 Clinton St., Buffalo, N. Y.
Excelso Water Heater. Booklet. 12 pp. 3 x 6 in. Illustrated. Describing the new Excelso method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)
Gorton & Lidgerwood Co., 96 Liberty Street, New York, N. Y.
Gorton Self-Feeding Boilers. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Descriptions, specifications and prices.
Kelsey Heating Company, James St., Syracuse, N. Y.
Booklet No. 5. 4 x 9 in. 32 pp. Illustrated. A dealers' booklet showing the Kelsey Warm Air Generator Method of warming and distributing air. Gives dimensions, heating capacities, weights, kind of coal recommended, and shows the mechanical and gravity system of heating homes, churches and schools.
Monroe Pipeless Booklet. 4½ x 8 in. 20 pp. Illustrated.
Monroe Tubular Heater. Booklet. 4½ x 8 in. 20 pp. Illustrated. General Booklet giving capacities, dimensions, weights, etc.
Syracuse Pipeless Booklet. 4½ x 8 in. 12 pp. Illustrated. General Booklet, giving sizes and capacities.
Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.
Minneapolis Heat Regulator Company, Minneapolis, Minn.
The Heart of the Heating Plant. Catalog. 6 x 9 in. 20 pp. Illustrated. Describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used.
Page Boiler Company, The Wm. H., 141 West 36th Street, New York, N. Y.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions with specifications of the Volunteer Round and Monarch Square Sectional Boilers; also the Monarch Up-Draft and Down-Draft Smokeless Boiler; with method for apportioning size of boiler and radiation, and other heating data.
Smith Co., H. B., 57 Main Street, Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.
B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 230. 8¼ x 10⅞ in. 132 pp. Illustrated. Gives description and data tables of various types of heaters, also of steam traps.
Bulletin No. 227. 8⅜ x 10 11/16 in. 28 pp. Blue prints of heating and ventilating layouts in public buildings, factories, etc.
Catalog No. 1015. Book on Heating and Ventilating, complete with installations and diagrams.
United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¼ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
Capitol Smokeless Type Boilers. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describing a new type of low-pressure heating boiler which burns soft coal without smoke.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 65*

Continued from page 65

HEATING EQUIPMENT—Continued

Warren Webster & Co., Camden, N. J.
Webster Vacuum System of Steam Heating. Catalog. 8 x 10½ in. 36 pp. Illustrated. Describing the Webster Vacuum System of Steam Heating, its principles of operation, and advantages of installation.
Webster Feed-Water Heaters. Catalog. 8 x 10½ in. 28 pp. Illustrated. Describing the construction and operation of the Webster Feed-Water Heaters for steam-heating systems, power plants and industrial plants of every type.

HEAT REGULATORS—See Heating Equipment

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

INSULATION

Bishopric Mfg. Company, 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Business Noise, Its Cost and Prevention. Booklet. 6 x 9¼ in. 16 pp. Illustrated. Data on correction of acoustics in offices, theaters, churches, etc.
Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated
United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Bulletin, 8½ x 11 in. Details and specifications for insulating roofs to prevent condensation.

LATH, METAL AND REINFORCING

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

LIGHTING SYSTEMS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Diffuselite System of Lighting. A number of leaflets and folders covering Diffuselite Paints, Blinds and Fixtures.

LUMBER

California Redwood Assn., 206 Marvin Bldg., San Francisco, Calif.
California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated. Describes the use of Redwood Lumber for various places and conditions in the building of the home.
Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.
The Post Everlasting. Booklet. 10½ x 7½ in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.
Poles That Resist Decay. Booklet. 9¼ x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.
Morgan Millwork Organization, Chicago, Ill.
Building With Assurance. Book. 8½ x 11 in. 408 pp. Illustrated. Valuable to architects for the Standardized Mill Work illustrated and described.
Price Supplement. Catalog. 4 x 8 in. 96 pp. Illustrated. Prices all illustrations in "Building With Assurance" and is valuable in connection with it or by itself.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Brass Company, Waterbury, Conn.
Illustrated pamphlet describes the use and adaptability of extruded architectural shapes to meet the architect's design.
American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.
Rome Brass & Copper Company, Rome, N. Y.
Descriptive Price List. 5 x 7 in. A leather-covered loose-leaf book listing sheets, tubes, rods, rolls, anodes, strips, extruded shapes, angles and channels, tapered tubes and hose pipes; molding, door-rail; commutator bars and segments; electrical copper bar, rivets and burs.

METAL TRIM—See Doors, Windows and Trim, Metal

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6⅜ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

OFFICE SUPPLIES

Dixon Crucible Co., Joseph, Pencil Dept., 224 J. Jersey City, N. J.
Finding Your Pencil. Booklet. 6¼ x 3¼ in. 16 pp. Illustrated.
The First Five. Booklet. 3½ x 5¼ in. 10 pp. Illustrated.
A Study in Sepia. Booklet. 7 x 4½ in. 5 pp. Illustrated.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Boston Varnish Co., Everett Station, Boston, Mass.
The Inviting Home. Booklet. 5½ x 9 in. 16 pp. Color Plates. A briefly worded book on painting for the busy architect or decorator.
Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.
Fox Co., M. Ewing, New York, N. Y.
Calcimines. Booklet. 3¼ x 6¼ in. 8 pp. Color cards.
S. C. Johnson & Son, Racine, Wis.
The Proper Treatment for Floors, Woodwork & Furniture. Booklet. 6¼ x 8⅜ in. 32 pp. Illustrated in color. A treatise on finishing hard and soft wood in stained and enameled effects; also natural wood effects.
Portfolio of Wood Panels. 5½ x 10¾ in. 14 pp. A portfolio containing actual panels of finished woods. Also contains valuable information on finishing and re-finishing floors and woodwork.
National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book. 5½ x 3¼ in. 100 pp. Gives directions and formulas for painting various surfaces of wood, plaster, metal, etc., both interior and exterior.
Red Lead in Paste Form. Booklet. 6¼ x 3½ in. 16 pp. Illustrated. Directions and formulas for painting metals.
Came Lead. Booklet. 8¾ x 6 in. 12 pp. Illustrated. Describes various styles of lead cames.
Cinch Anchoring Specialties. Booklet. 6 x 3½ in. 20 pp. Illustrated. Describes complete line of expansion bolts.
O'Brien Varnish Co., 1121 Washington Avenue, South Bend, Ind.
That Magic Thing Called Color. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.
Architects' Specification Manual. 8½ x 11 in. 50 pp. Complete specifications for all paint products.
Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Preservative Coatings. Booklet. 6 x 9 in. 15 pp. Illustrated. Presents in a concise manner the properties and uses of the Standard Paint Company's various paint preparations.
Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.
Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.
Wadsworth-Howland Co., Inc., Boston, Mass.
Paints and Varnishes. Catalog. 5¾ x 8½ in. 140 pp. Illustrated. Covers the complete line.

PARTITIONS

Improved Office Partition Company, 25 Grant St., Elmhurst, L. I.
Telesco Partition. Catalog. 8¼ x 11 in. 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.
Detailed Instructions for erecting Telesco Partitions. Booklet. 24 pp. 8½ x 11 in. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.
The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Folding Partitions. Booklet. 8½ x 11½ in. 16 pp. Illustrated. Covers the field of folding partitions for churches, schools, hotels, clubs and public institutions.
Rolling Partitions, Hygienic and Disappearing Door Wardrobes. Booklet. 6 x 9 in. 32 pp. Illustrated. Describes rolling partitions, particularly in churches and schools, and wardrobes as installed in schools and public institutions.

PIPE

American Brass Company, Waterbury, Conn.
Illustrated pamphlet giving tables of weights and price-lists devoted to Brass and Copper Pipe in iron pipe and plumbers' sizes.
Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.
National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.

PLUMBING EQUIPMENT

American Brass Company, Waterbury, Conn.
Benedict Nickel. Illustrated pamphlet descriptive of Benedict Nickel White Metal for high-grade plumbing fixtures.
Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3¼ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 66*

PLUMBING EQUIPMENT — Continued

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.

Kohler Co., Kohler, Wis.
Kohler of Kohler. 5½ x 8 in. 48 pp. Illustrated catalog. Shows complete line of plumbing fixtures.

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Speakman Company, Wilmington, Del.
Speakman Showers and Fixtures. Catalog. 4½ x 7½ in. 250 pp. Illustrated. Catalog of Modern Showers and Brass Plumbing Fixtures, with drawings showing layouts, measurements, etc.
Toned Up In Ten Minutes. Booklet. 7½ x 10½ in. 16 pp. Illustrated. Modern Showers and Washups for Industrial Plants, showing the sanitary method of washing in running water.

Wolff Manufacturing Company, 255 No. Hoyne Ave., Chicago, Ill.
Plumbing Suggestions. Catalog. 3¼ x 6 in. 50 pp. Illustrated. Illustrating, describing and pricing Wolff Quality Plumbing Fixtures for residential installation.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10⅝ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

ROLLING DOORS AND SHUTTERS

The J. G. Wilson Corporation, 8 West 40th St., New York, N. Y.
Rolling Doors and Shutters—Steel and Wood. Catalog. 8½ x 11½ in. 80 pp. Illustrated. For engineers and architects. Covers all classes of heavy doors, for every purpose, and in great variety of materials, bronze, steel and wood. Many sheets of detail drawings.

ROOFING

American Brass Company, Waterbury, Conn.
Copper Products for Roofing Purposes. Illustrated price-list devoted to copper products, including sheets and rolls, for fabricating into leaders, gutters, flashings, shingles, etc.

Creo-Dipt Company, 1025 Oliver St., North Tonawanda, N. Y.
Architectural Service Sheets. 8½ x 11 in. Illustrated. Working drawings of construction, with standard specifications for design and construction of same.

Philip Carey Co., The, Cincinnati, Ohio.
Architects Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Illinois Zinc Company, 280 Broadway, New York, N. Y.
Pure Rolled Zinc. (Corrugated and Plain Sheets.) Booklet. 3½ x 6¼ in. 8 pp. Illustrated. Facts regarding adaptability of zinc for roofing. Specifications of corrugated zinc sheets. Weights per square. Comparative gauge lists.
The Roof That's Always New. Booklet. 3⅝ x 6 in. 12 pp. Illustrated. Story of Illinois Zinc Shingles, their everlasting and artistic qualities. Information regarding a complete zinc roof, shingles, starting piece, valley, ridge and hip piece.

Johns-Manville, Inc., Madison Avenue and 41st Street, New York.
Johns-Manville Colorblende Asbestos Shingles. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. 3½ x 6 in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Instructions for Laying Built-up Roofs. Booklet. 8½ x 11 in. Illustrated.
Roofing Facts Worth Knowing. Booklet. 6 x 9 in. 16 pp. Illustrated.

N. & G. Taylor Company, 300 Chestnut Street, Philadelphia, Pa.
Selling Arguments for Tin Roofing. Booklet. 6¼ x 9¼ in. 80 pp. Illustrated. Describes the various advantages of the use of high grade roofing tin, gives standard specifications, general instructions for the use of roofing tin, illustrates in detail methods of application.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHEATHING

Bishopric Mfg. Company, 103 Este Ave., Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric Stucco-Board and Bishopric Sheathing Board.

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Volume 3. Series A-3. Standard Specifications for Cut Indiana Limestone work. 8½ x 11 in. 56 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.
Vol. 1. Series B. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 27. Series B. Designs for Houses of Indiana Limestone. 8½ x 11 in. 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review.*

STORE FRONTS

Kawneer Co., The, Niles, Mich.
Kawneer Solid Copper Store Fronts. Catalog. "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
A Collection of Successful Designs. Catalog. 9¼ x 6½ in. 64 pp. Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

Zouri Drawn Metals Co., B. J. 10, Chicago Heights, Ill.
Architects' Catalog. 8¾ x 11¾ in. 86 pp. Illustrated. Showing a true copy of the approval of the Underwriters' Laboratories. Showing a proper glazing specification, based on the Underwriters' Report.
Catalog B. J. 8. 6 x 9 in. 68 pp. Illustrated. Key to Getting the People In.

STUCCO BASES

Bishopric Manufacturing Co., 103 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco board and Bishopric sheathing board.

STUCCO, MAGNESITE

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

TERRA COTTA

Atlantic Terra Cotta Co., 1170 Broadway, New York, N. Y.
Questions Answered. Booklet, 7½ x 5¼ in. 32 pp. Illustrated. A synopsis of questions most frequently asked by architects in relation to terra cotta, with brief but complete answers; contains many illustrations.

National Terra Cotta Society, 1 Madison Avenue, New York, N. Y.
Standard Construction, Indexed, bound volume. 10½ x 16 in. 90 pp. 70 Illustrations. Standard forms of terra cotta construction with short article.
"The School." 10½ x 13½ in. 34 pp. 92 Illustrations. Types of school buildings with short descriptive articles. Volume I, brochure series.
"The Theatre." 10½ x 13½ in. 36 pp. 102 Illustrations. Types of theatre buildings with short descriptive articles. Volume II, brochure series.
"The Store." 10½ x 13½ in. 34 pp. 60 Illustrations. Types of store buildings with short descriptive articles. Volume III, brochure series.

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

THERMOSTATS—See Heating Equipment

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 67*

TILE, FLOOR AND WALL—Continued

Norton Company, Worcester, Mass.
Alundum Safety Tile. Booklet. 5 x 8 in. 15 pp. Illustrated. Description of material and its installation.
Tests of Alundum Tile. Booklet. 5 x 8 in. 18 pp. Illustrated. Describes its composition and proves its adaptability for its innumerable purposes.

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172. 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.
Fireproof Buildings of Natco Hollow Tile. Booklet 8½ x 11 in. 16 pp. Illustrated. Showing the use of Natco Hollow Tile for private residences.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates.
Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ in. 16 pp. Illustrated.

Warren Webster & Co., Camden, N. J.
The Webster Type N Modulation Valves. Catalog. 8 x 10½ in. 8 pp. Illustrated. Describing a quick response, conveniently operated, and simple radiator supply valve.
The Webster Sylphon Trap. Booklet. 8 x 10½ in. 12 pp. Illustrated. Explaining the importance of the properly operating radiator return trap.

VENTILATION

Globe Ventilator Co., Dept. P., Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.

WALL BOARDS

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Walls of Worth. Booklet. 8½ x 11 in. 24 pp. Illustrated. Describes Sheetrock, the fireproof wall board, its advantages and uses.

WATERPROOFING

Ruberoid Co., The, 95 Madison Ave., N. Y.
Impervite. Circular. 8½ x 11 in. 4 pp. Illustrated. An integral waterproofing compound for concrete, stucco, cement, mortar, etc.

WATER SOFTENERS

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WINDOW HARDWARE

The Kawneer Company, Niles, Mich.
Kawneer Simplex Windows. Catalog. 8½ x 10½ in. 16 pp. Illustrated. Complete information, with measured details, of Kawneer Simplex Weightless Reversible Window Fixtures, made of solid bronze. Shows installations in residences and buildings of all sorts.
Detail Sheets and Installation Instructions. Valuable for architects and builders.

Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¼ in. 24 pp. Illustrated. Covers complete line.

Smith & Egge Mfg. Co., The. Bridgeport, Conn.
Booklet. 6¾ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

WINDOWS, CASEMENT

Crittall Casement Window Co., 2703 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.

Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Architects' Portfolio. 8½ x 11 in. Loose-leaf. Large scale working details for mill-work and installation.
F. S. Details 20 x 23 in. and 15 x 22 in. Working details for mill-work and installation.
Hoffman Casements Catalogue. 7 x 8½ in. 16 pp. Illustrated.

Hope & Sons. Henry, 103 Park Avenue, New York.
Catalog. 12½ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

WOOD — See Lumber

Mr. Architect,
—What Would *You* Have Done?

The good citizens of Arlington wanted a very fine High School.

The complete structure was most attractive and conformed with state laws. Stair wells were fire-resistive; basement ceilings protected with metal lath and plaster. In short, this structure exemplified the last word in school construction, until —

The Fire

— a sharp blaze in the chemical supply room in one of the upper floors where a "saving" had been effected by using ordinary instead of *Metal Lath*. The estimated total damage was $25,000. But the National Fire Protection Association says:

"It would have entailed an additional expense of only $3,000 at the most (a saving of $22,000) when the building was erected to have protected the upper floors as well as the lower with Metal Lath."

Which would have been truer economy?

Samples of metal lath and reference book — "Fireproof Construction" — sent upon request.

Kno-Burn
Metal Lath
"THE STEEL HEART OF PLASTER"

Distributors in Principal Cities

North Western Expanded Metal Company
934 OLD COLONY BUILDING
Chicago

New York Atlanta Los Angeles Boston Cincinnati Minneapolis
St. Louis Dallas

NORTH WESTERN EXPANDED METAL CO.
CHICAGO

THE certain excellence of the products of this Company is coupled with the successful upbuilding of business.

Send for new set of Weight Cards for Black and Galvanized Sheets—also our perpetual Calendar.

Black and Galvanized Sheets

Tin and Terne Plates, Etc.

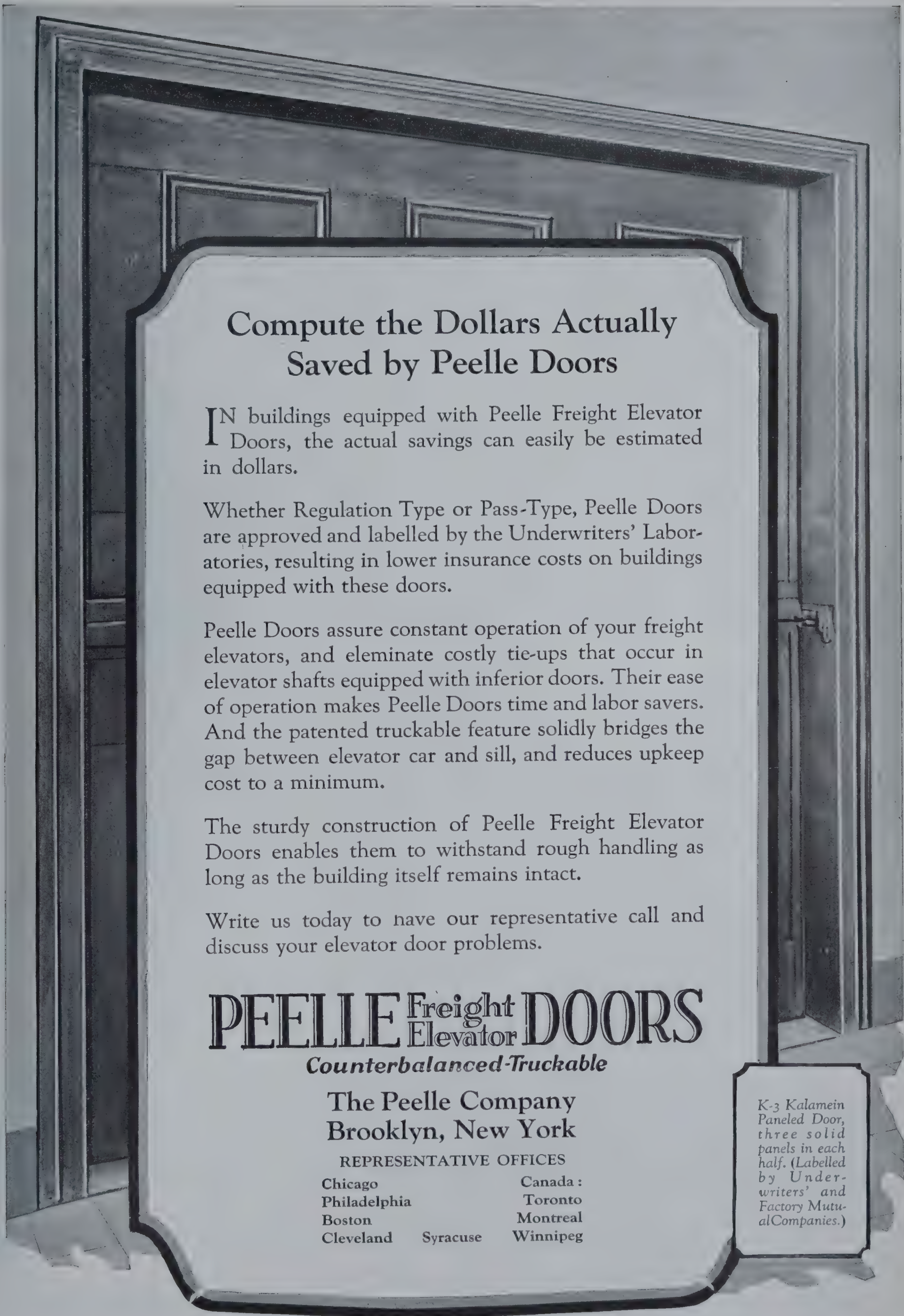
Careful manufacture, correct price and recognized merit assure important economies to the consuming trades. Architects and users will find it to their advantage to avail themselves of the service and facilities we offer.

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

MANUFACTURERS OF

Sheet and Tin Mill Products of every description, including Black Sheets, Galvanized Sheets, Tin and Terne Plates, Electrical Sheets, Corrugated and Formed Roofing and Siding Materials, Special Sheets for Stamping, Wellsville Polished Steel Sheets, Automobile Body Sheets, Deep Drawing Sheets, Fire Door Stock, Black Plate, Etc.


Compute the Dollars Actually Saved by Peelle Doors
IN buildings equipped with Peelle Freight Elevator Doors, the actual savings can easily be estimated in dollars.
Whether Regulation Type or Pass-Type, Peelle Doors are approved and labelled by the Underwriters' Laboratories, resulting in lower insurance costs on buildings equipped with these doors.
Peelle Doors assure constant operation of your freight elevators, and eleminate costly tie-ups that occur in elevator shafts equipped with inferior doors. Their ease of operation makes Peelle Doors time and labor savers. And the patented truckable feature solidly bridges the gap between elevator car and sill, and reduces upkeep cost to a minimum.
The sturdy construction of Peelle Freight Elevator Doors enables them to withstand rough handling as long as the building itself remains intact.
Write us today to nave our representative call and discuss your elevator door problems.
PEELLE Freight Elevator DOORS
Counterbalanced-Truckable
The Peelle Company
Brooklyn, New York
REPRESENTATIVE OFFICES
Chicago
Philadelphia
Boston
Cleveland
Syracuse
Canada:
Toronto
Montreal
Winnipeg
K-3 Kalamein Paneled Door, three solid panels in each half. (Labelled by Underwriters' and Factory Mutual Companies.)

(Right)
LAIRD SCHOBER COMPANY
23d and Market Sts.
Philadelphia

Wm. Steel & Sons Co.
Architects

(Below)
PUSEY & JONES
Wilmington
Del.

WILSON

Standard for forty-five years

Rolling STEEL Doors

Underwriters' Label Service

MAKE YOUR BUILDING FIREPROOF

USED in industrial plants, mercantile houses, freight and car sheds the country over. Endorsed by leading architects and engineers everywhere.

Wilson Rolling Steel Doors effect economy in building. Durable in construction. Easy to install and operate. Overhead and out of the way when not in use, saving valuable floor and wall space. Super-strong, fireproof. Operated by hand, by chain or crank gear, or by motor.

Rolling WOOD Doors—For use wherever metal rolling doors are not applicable, especially in chemical plants and roundhouses. Specially treated wood and bronze fittings to withstand corrosive fumes. When raised to 10 feet from the lintel, it automatically clears the opening and stops exactly at the lintel.

Our offices in principal cities put our Engineering Department at your instant service for details of Wilson products. Wilson prices have been reduced as much as possible consistent with our policy of 45 years in giving each Wilson customer the highest Quality and Service.

Write for circulars. Details also in Sweet's Architectural and Engineering Catalogues

THE J. G. WILSON CORPORATION

EXECUTIVE OFFICES: 8 WEST 40th STREET, NEW YORK FACTORIES: NORFOLK, VA.

BINDERS

for

The Architectural Forum

TO those subscribers who want a convenient method of keeping their files in a good workable condition, we offer a low-cost binder of good quality that meets all requirements.

The covers are of heavy cloth-covered board with strong reinforcing bars at the back. The copies may be easily inserted or removed without the necessity of any cutting or mutilation. They are held in place by narrow steel strips which hook over upright steel posts, made in sections so that the binder is equally serviceable for a few copies or for an entire volume. The title is stamped in gold on the front cover.

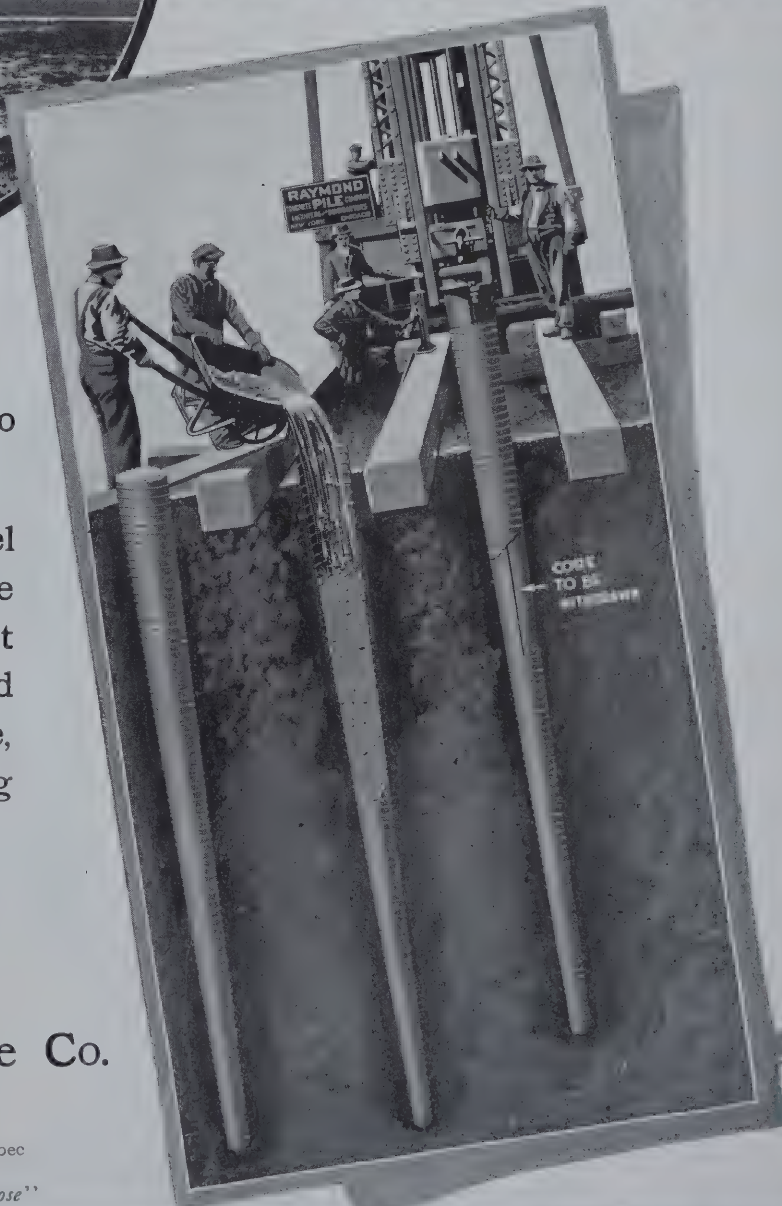
In addition to a regular supply provided for The Forum in its present size, we are able to offer a limited number of the former size, printed with either title, The Brickbuilder or The Architectural Forum. The same price applies to all. In ordering, state which is wanted.

Sent postpaid to any address in the United States for $1.75.

THE ARCHITECTURAL FORUM
142 Berkeley Street, Boston 17, Mass.

The Remedy *for* Lowlands

Raymond Concrete Piles



Swampy ground holds no terrors for these piles.

The spirally reinforced steel shell into which each pile is cast is left in place—it prevents mixture of ground water with the concrete, as well as withstanding ground pressure.

Feet of piling placed to date
Over
15,000,000

Raymond Concrete Pile Co.

NEW YORK, 140 Cedar Street
CHICAGO, 111 W. Monroe Street
Raymond Concrete Pile Co., Ltd., Montreal, Quebec
Branch Offices in all Principal Cities

"A Form for Every Pile—A Pile for Every Purpose"

Lord & Taylor, Fifth Avenue, New York

Frink Lighting for Stores

The architect handling a store problem will find a firm ally in the Frink Engineering Department.

We know that proper illumination is not only a matter of efficiency but one of the best advertisements the store can have. The Frink System is based on an intimate knowledge of the very varying needs of each department. It covers general illumination, also units for galleries, show cases and windows.

Frink System of Synthetic Lighting

Applied to show windows, this puts at the disposal of the window dresser attention-compelling color effects comparable only to those of the stage. It is used by such stores as:

James McCreery & Co.
Lord & Taylor
R. H. Macy Co.
Abraham & Straus

Catalog 424 describes in detail the Frink Lighting System for stores, and should be in every architect's library.

I.P. FRINK, Inc.

24th Street and 10th Avenue, New York, N. Y.

CHICAGO, ILL. Wrigley Building — PHILADELPHIA, PA. Fuller Building — CLEVELAND, O. 6010 Euclid Ave.
SAN FRANCISCO, CALIF. 77 O'Farrell St. — CINCINNATI, O. 17 Greenwood Building

No. 205
7'-1" high to bottom of upper globe

Exterior Lighting Fixtures

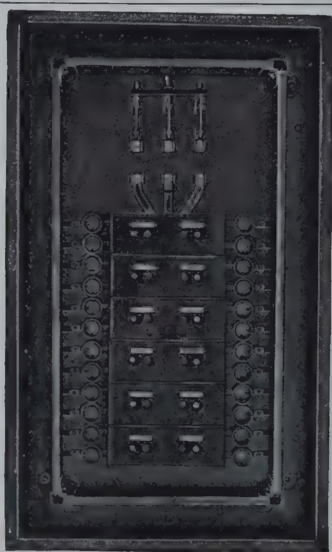
Frequently in designing a building the architect feels that exterior lighting fixtures would add appreciably to the beauty of his creation, but the expense of specially designed fixtures is prohibitive.

To meet such contingencies we issue a catalogue showing over 200 artistic designs of **Lamp Standards, Brackets and Lanterns.**

Our complete catalogue will be mailed on request

SMYSER-ROYER CO.

Main Office and Works: York, Pa.
Philadelphia Office: 1609 Sansom Street



FA Safety Panel Boards and Cabinets are used in the Arcade Building, the newest, and in many ways the finest, office structure in St. Louis.

Safety
Panel Boards & Cabinets

are sectionally covered, therefore thoroughly accessible — easy to install — easy to inspect or repair. Write for Bulletin A.F., fully describing them.

Frank Adam Electric Co.

GENERAL OFFICES: ST. LOUIS, MO., U. S. A.

Branches: DETROIT MINNEAPOLIS CINCINNATI DALLAS KANSAS CITY NEW ORLEANS CHICAGO

Manufacturers of A. C. and D. C. Knife Switches, Panel Boards, Cabinets and Major Theatre Equipment, Fan Hanger Outlets and Floor Outlet Boxes

BRASCOLITE

PATENTED AND TRADE MARK REGISTERED

The Ideal Light for Every Purpose

Specially designed fixture of compo construction with old ivory tinted reflector base and ceiling band finished in antique gold. Bowl of calcite glass

High ceilings offer no difficulty when rooms are equipped with Brascolites

BRASCOLITES were selected for the Illinois Bell Telephone Company's general offices after a careful consideration of the problem and various tests extending over a period of more than a year. Competent architects and engineers of the Telephone Company, as well as engineers outside their organization, were consulted and all factors which should enter into the selection of lighting equipment were carefully considered in the light of experience gained from long time operation of sample fixtures.

That the Brascolite has solved the problem in this case is evidenced by the photograph. The ceiling in this room is extremely high and heavily beamed. The space is used for general office work of a particularly exacting nature, and a fairly high intensity was considered necessary as well as thorough diffusion and uniformity. An amber tone to the light was considered desirable.

Tests were made with various systems and a special Brascolite with "calcite" bowl and old ivory tinted reflector was selected as conforming most nearly to all of the rigid requirements. Even in the case of the extremely high ceiling the entire room presents a well lighted appearance — a splendid illustration of the Brascolite slogan,— "Better Light Saves the Sight."

Our general Catalogue No. 8 pictures and describes the Standard Brascolite line — a Brascolite for every purpose. Let us send you a copy. We also have for distribution a series of special catalogues on lighting equipment to meet special requirements. Write us for the one that interests you, No. 1 — Hospitals; No. 2 — Banks and Office Buildings; No. 3 — Schools, Colleges and Y. M. C. A. buildings.

Our Designing and Engineering Departments are at your service, without obligation, for any special requirements.

The Brascolite Company, St. Louis, U. S. A.

Division of the St. Louis Brass Manufacturing Company

Branch Offices

Sales and Service

Atlanta Boston Chicago Cincinnati Detroit Kansas City Los Angeles
Minneapolis New Orleans New York Oklahoma City Omaha Philadelphia

Canadian Distributor

Northern Electric Company
LIMITED
Montreal

& COMPANY
CHICAGO, ILL.

Cafeteria of the Erie Academy High School, one of the five School Cafeterias installed by Albert Pick & Company for the City of Erie, Pa.

The Erie Academy High School, Wm. B. Ittner, Architect.

for Public Service

O'Brien's

CHAUTAUQUA APARTMENTS, New York City
Cross & Cross, Architects
Finished With Liquid Velvet

Modern Buildings and Liquid Velvet

THE Chautauqua Apartments of New York City, shown above, are finished throughout with *Liquid Velvet*, the perfect flat wall enamel. In fact many of the finest apartments, residences and public buildings in the country have *Liquid Velvet* walls and ceilings, in line with their beautiful interiors and appointments. Architects invariably find their good judgment complimented, by the appreciation of their clients, when *Liquid Velvet* is specified. There are many reasons for this.

For instance—*Liquid Velvet* shades are determined by expert color artists. You find precisely the tint needed to perfect your client's color scheme. Furthermore, *Liquid Velvet* combines the beauty of water colors with the durability of enamel.

Liquid Velvet walls and ceilings may be kept fresh and clean for years. In fact, the original soft color tones and delicate texture of *Liquid Velvet* are *freshened* by washing.

Other O'Brien products of unusual merit are: *Master Varnish, Flexico White Enamel* and *Pyramid Natural Wood Finishes.*

O'BRIEN VARNISH COMPANY
1141 Washington Avenue, SOUTH BEND, IND.

"Varnish Makers for Half a Century"

Liquid Velvet
THE SPECIFIED BRAND

MURALITE

THOSE clients who demand quality with economy in the interior decoration of their buildings will be glad to know about **Muralite**—the hot water wall finish. It's sanitary, durable, combines great opacity with large covering power, and lends itself to innumerable artistic effects. **Muralite** gives perfect results over any surface at a fraction of oil paint cost. A trial specification is sure to develop others. Write for data.

M. EWING FOX COMPANY

New York **Chicago**

California State Bldg.
Balboa Park, San Diego, Calif.

Bay State Protection

The architect's ideas of beauty are faithfully carried out by Bay State Brick and Cement Coating. And it protects the buildings he creates. Leading architects specify it.

It makes all buildings of brick, cement and stucco proof against dampness, rain, sun, and foul weather. Write today for samples in white and colors and booklet No. 10.

WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Manufacturers
Boston, Mass.

New York Office **Philadelphia Office**
Architects' Bldg. **1524 Chestnut Street**

BAY STATE
Brick and Cement Coating

THE BAY STATER

ONE QUART
U.S. STANDARD MEASURE
SHERWIN-WILLIAMS
Old Dutch Enamel
THE SHERWIN-WILLIAMS CO
Beats the Dutch
for Whiteness
SWP
COVER THE EARTH
SHERWIN-WILLIAMS
SWP
COVER THE EARTH
Old Dutch Enamel

Sturtevant

REG. U.S. PAT. OFF.

PUTS AIR TO WORK

STARRETT & VAN VLECK *Architects* — TRADING FLOOR, NEW YORK CURB MARKET — *Photo by Underwood & Underwood*

The New York Curb Market Brings Fresh Air Indoors

THE New York Curb has deserted the frenzied pavement of Broad Street for a warm, dry and handsome new building on Trinity Place. The busy brokers will still have the freedom and exhilaration of the outdoors because

Sturtevant Equipment

was chosen to provide complete ventilation along modern approved scientific lines. The long list of important buildings in which you find Sturtevant apparatus is the best evidence of the satisfactory service that Sturtevant methods produce. Our branch offices in twenty-four cities have qualified engineers to discuss heating and ventilating problems with you. We invite the opportunity of considering plans at an early stage of development so that our wide experience on this technical subject may be freely drawn upon.

B. F. STURTEVANT COMPANY

HYDE PARK, BOSTON, MASS.

STURTEVANT BRANCH OFFICES

ATLANTA, GA. 306 Walton Bldg.
BOSTON, MASS. 555 Mass. Trust Bldg.
BUFFALO, N. Y. 100 Bedford Ave.
CHICAGO, ILL. 530 So. Clinton St.
CINCINNATI, OHIO 610 4th National Bank Bldg.
CLEVELAND, OHIO 330 Guardian Bldg.
DALLAS, TEXAS 3411 Knight St.
DETROIT, MICH. 406 Marquette Bldg.
HARTFORD, CONN. 36 Pearl Street
KANSAS CITY, MO. 707 Mutual Bldg.
LOS ANGELES, CALIF. 411 Hollingsworth Bldg.
MINNEAPOLIS, MINN. 804 Met. Life Bldg.
NEW YORK, N. Y. 52 Vanderbilt Ave.
PHILADELPHIA, PA. 135 No. Third St.
PITTSBURGH, PA. 711 Park Bldg.
ROCHESTER, N. Y. 1024 Granite Bldg.
ST. LOUIS, MO. 2086 Railway Exchange Bldg.
SALT LAKE CITY, UTAH 818 McIntyre Bldg.
SAN FRANCISCO, CALIF. 759 Monadnock Bldg.
SEATTLE, WASH. 1105-1106 White Bldg.
WASHINGTON, D. C. 1006 Loan & Trust Bldg.
B. F. STURTEVANT CO. OF CANADA, LTD. GALT, ONT.
MONTREAL 404 New Birks Bldg.
TORONTO 210 Lumsden Bldg.

The Heart of a Plumbing Installation

Clow Madden Automatic Closet

This type of closet, the extraordinary maintenance economy of which makes it very desirable for industrial plants. The valve consists of only three movable parts—the seat and the stems. It is extremely durable and readily accessible for replacement of the rubber washers—the only part that ever wears out.

Good porcelain, well-plated metal, durable woodwork—those things are *important*. But the valve mechanism of the closet is *vital*. The health of the occupants of the building literally depends upon it.

Clow experience, Clow thoroughness and Clow ideals are represented in valves for various purposes. Made without regard for considerations of price, they are offered and sold only to those who want the *best*.

In the three distinct valve constructions illustrated the acme of perfection in closet operation is attained.

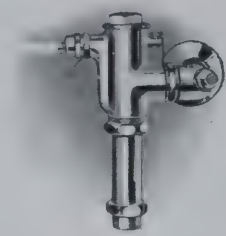
The selection of either type, when embodied in a complete water closet combination, to meet building requirements, preference of operation or a special service assures satisfaction, durability, and economy of operation.

The operating mechanism of a water closet combination IS VITAL.

JAMES B. CLOW & SONS

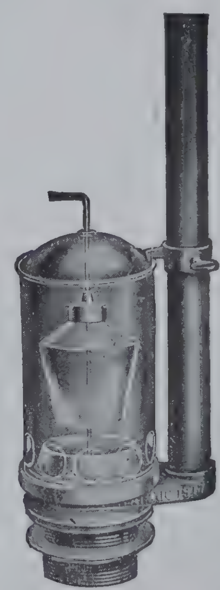
General Offices: 534-546 S. Franklin Street, Chicago

Sales offices in the principal cities



Clow Water Controlled Flush Valve

This type of valve, for direct connection to mains, on account of its simplicity of construction and operation makes it without a rival in its field.



The Clow-Shoppe Flush Valve

This type of valve in a low down tank eliminates all troubles commonly prevailing in this type of construction.

CLOW

METAL ANALYSES—The metallurgist plays an important part in the manufacture of Jenkins Valves, for a good valve must contain good metal. Metal is bought on analyses; and, to maintain a high standard, analyses of cast metal are regularly made. Metal is mixed and charges are prepared under the supervision of competent metallurgists.

A high standard perpetually maintained

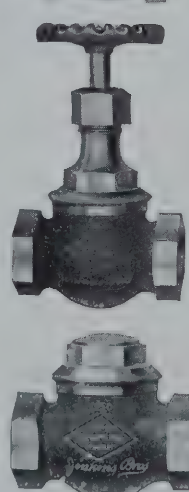
JENKINS VALVES occupy an extraordinary position — they are known not only as good, serviceable valves, but commonly set the standard by which engineers and architects judge other valves.

Reputation and prestige throw an obligation upon a manufacturer, for a standard once established must be constantly and assuredly maintained. During each step in the manufacture of every valve, Jenkins Bros. are mindful of this obligation, and also of the fact that dependent upon valves are comfort, convenience, fuel economy, and safety to life and property.

Jenkins design provides a heavier, stronger valve. The "analyses proved" metal is uniformly cast, and castings are accurately machined to assure unity of parts. (Parts are interchangeable, and proper replacements can be supplied readily for any Jenkins Valve.) Each valve must "prove" itself in rigid tests and leaves the factory fully guaranteed — a valve that is safe and dependable in severe as well as average service.

Jenkins Valves are made in brass, iron, and steel for all requirements. The Jenkins "Diamond Mark" and signature on each valve identify the genuine — at supply houses everywhere.

Send for data on the valves in which you are interested.

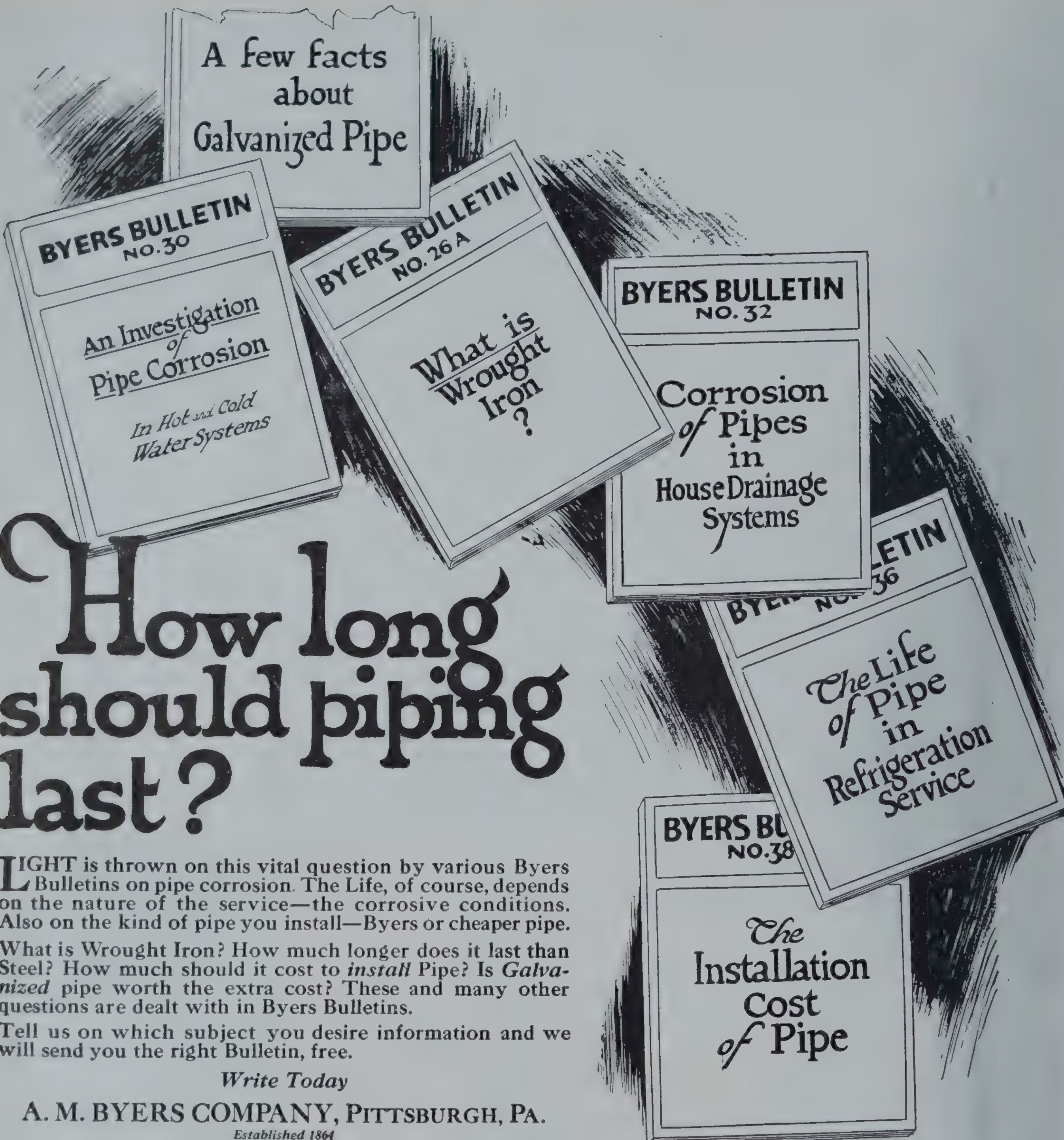


REG. U.S. PAT. OFF.
TRADE JENKINS MARK
Jenkins Bros

INSTANTANEOUS, FREE, FULL FLOW—is given by this Jenkins "Rapid Action" Valve which can be opened wide with quarter pull of lever. Stays open automatically. Stops water waste, saves time. For use on washers in laundries; in bottling establishments; in bathhouses; on various machines, and in places where much water is used and a dependable, quick opening valve is required.

JENKINS BROS.
New York Boston Philadelphia Chicago
Montreal London Havana
FACTORIES: Bridgeport, Conn.; Elizabeth, N. J.; Montreal, Canada

Jenkins Valves
SINCE 1864



How long should piping last?

LIGHT is thrown on this vital question by various Byers Bulletins on pipe corrosion. The Life, of course, depends on the nature of the service—the corrosive conditions. Also on the kind of pipe you install—Byers or cheaper pipe.

What is Wrought Iron? How much longer does it last than Steel? How much should it cost to *install* Pipe? Is *Galvanized* pipe worth the extra cost? These and many other questions are dealt with in Byers Bulletins.

Tell us on which subject you desire information and we will send you the right Bulletin, free.

Write Today

A. M. BYERS COMPANY, PITTSBURGH, PA.

Established 1864

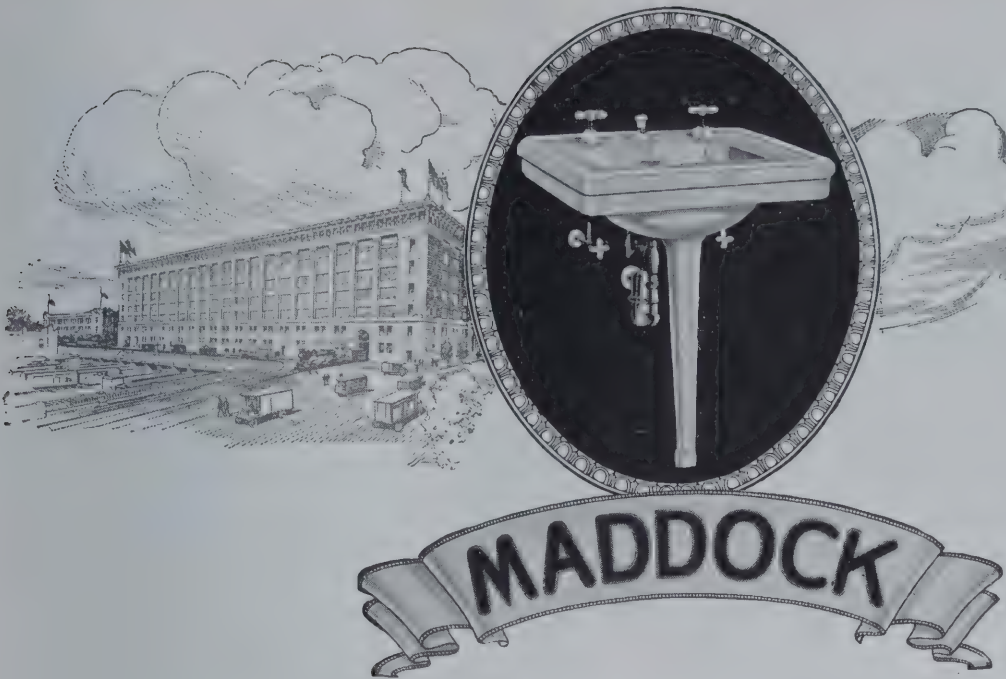
NEW YORK BOSTON PHILADELPHIA CLEVELAND CHICAGO

BYERS PIPE

GENUINE WROUGHT IRON
FULL WEIGHT GUARANTEED

Look for the Name and Year rolled in every length


The Blue Book of Plumbing
Catalogue R
THE TRENTON POTTERIES COMPANY
TRENTON NEW JERSEY U.S.A.



In the mammoth Bevo Plant, St. Louis, Mo.
Associated Architects:
Widemann & Walsh,
Klipstein & Rothmann, St. Louis.
Plumbing Contractors: Abel Garhard Plumbing Co., St. Louis, Mo.
Plumbing Jobbers: N. O. Nelson Mfg. Co., St. Louis.

Plumbing equipment that gives the utmost in service

The mammoth Bevo Plant, St. Louis, Mo., equipped with every device known for protecting health and insuring the safety of employes, is equipped with Thomas Maddock sanitary fixtures.

Plumbing fixtures are bought but once or twice in a lifetime. Therefore, such equipment should be selected on the basis of SERVICE—service in labor saved, service in preventing disease and service in safeguarding health.

Maddock fixtures are made entirely of glistening, snow white, almost unbreakable vitreous china which gives years and years of *service* without repairs and without showing age. They are easy to keep clean, are sanitary and always can be depended upon to protect health.

If you do not have a complete file of Maddock literature, write for our architect's catalog which describes fully the Maddock line of fixtures for the home, public buildings, hospitals, etc.

See our section in the Fourteenth Annual Edition of Sweet's Catalog, pages 1037 to 1044.

Thomas Maddock's Sons Company, Trenton, N. J.
OLDEST SANITARY POTTERS IN AMERICA — ESTABLISHED 1859
Manufacturers of sanitary earthenware plumbing fixtures for bath, kitchen and laundry needs in the home; also sanitary ware for medical, industrial, commercial and public building installations
Branches: New York – Philadelphia – Chicago – San Francisco – St. Louis

THOS. MADDOCK'S SONS CO. TRENTON, N.J.

The fixture shown above is the Madbury. A one-piece vitreous china lavatory of the center leg support type with integral supply nozzle and overflow cleansing device, both exclusive Maddock features.
The valve handles and other slab fittings are also made of vitreous china, which eliminates the care required to keep ordinary metal parts clean.
This lavatory may also be furnished with pedestal instead of center leg support, when so desired.

M First in the industry — foremost since M

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO. "Truscon Mechanical Operators" (8½ x 11 ins.). 48 pp.

The improvement which is so marked in manufacturing buildings, in schools of certain types and in structures of many kinds covering extensive areas is closely bound up with the provision of large window spaces which often form a considerable part of the exterior walls. To secure an abundant supply of fresh air, any size or arrangement of ventilated areas may be had. Entire walls can be filled with ventilated sidewall sash, and the faces of lantern monitor and sawtooth can be filled with sidewall sash or with long lines of continuous sash, but to secure the full benefit of such installations it is necessary to be able to control the opening and closing of the ventilated areas quickly and easily.

The very extent of the variety of steel sash and the operators by which they are controlled renders their selection and specification of great importance to architects and engineers and in this carefully prepared catalog which is freely offered to those concerned will be found listed, illustrated and described the numerous forms of steel sash and devices for their manipulation which are made by this large manufacturing firm. The scope of the catalog is such that it goes with equal care into the information necessary for the selection of steel sash suitable for use in a comparatively small window area and for the specification of great lengths of sash in which a line of tension rod is used for opening and closing the shafts.

In addition to listing the data which engineers and architects will find necessary in specifying or ordering steel sash this brochure places at the disposal of those interested the services of the company's engineering staff in solving special problems or in working out installations of the most efficient type.

GORTON & LIDGERWOOD COMPANY, NEW YORK AND CHICAGO. "The Gorton Single Pipe Vapor Heating System" (3½ x 6¼ ins.). 16 pp.

Economy in building is promoted by the use of heating systems which require but a single pipe, and economy in operation may be effected by using devices which produce economy in fuel by ready control of the heat. This booklet describes the economy made possible by the use of the Gorton Single Pipe Vapor System which is the result of two Gorton appliances,—the Vapor Air Relief Valve and the Quarter Turn Packing Lock Radiator Valve.

The Vapor Air Relief Valve works independently of any thermostatic action; the air passageway is entirely clear and the area of the passageway is four times greater than that of any automatic air valve. This permits the air to be quickly expelled from a radiator when the supply valve is open, admitting vapor at even the slightest pressure. When the radiator has been cleared of air the vapor will instantly *close* the inlet opening of the Air Relief Valve. This prevents water from collecting in the valve and the outlet of the Air Relief Valve being always open it is impossible for a vacuum to form in it. The Quarter Turn feature of the Gorton Radiator Valve makes it even easier to turn off a radiator than to open a window, for merely a turn of the wrist will fully open or close the valve, and because the valve is so easily manipulated heat is saved at the radiators and coal at the boilers, the result being reduced coal bills.

THE STRUCTURAL SLATE COMPANY, PEN ARGYLE, PA. "Structural Slate," Chapters 6, 7, 8 (8½x11 ins.). 20, 28, 24 pp.

These are the most recent parts of the slate data that are being compiled under The Structural Service Bureau to show the standardization of sizes, parts and arrangement. The contents of the three are "Urinal Stalls," "Shower Stalls" and "Laundry Tubs, Sinks and Sink Tops," respectively, all presented in a clear and concise manner. Besides a statement by this company concerning its aims in unifying the parts produced, there are shop drawings for jointing and construction and isometric diagrams showing positions and spaces required. Partition and screen heights, for instance, are established, as are other units, with the consideration of all practical purposes in mind, and enough variety in types appear to meet the ideas of all who would benefit by the standardization. Dimension and price charts are to be found with each kind of equipment. Previous chapters in this series are on Geologic Data, Basic Specifications, Stairways, Fittings and Toilet Enclosures.

ANNOUNCEMENTS

The engineering firm of Parsons, Klapp, Brinckerhoff & Douglas announce the organization of Parklap, Inc., for the purpose of further increasing their facilities of handling construction work of all classes, and the continuance of the Parklap Construction Corporation, for the construction of large projects. Home office, 84 Pine street, New York.

Ralph O. Beattie & Co. announce the opening of offices for the practice of architecture in the Fontron Loan & Trust Co. Bldg., North Sherman street, Hutchinson, Kan. Manufacturers' samples and catalogs are requested.

Cram & Ferguson, architects, of Boston have removed their offices from 15 Beacon street and are now located at 248 Boylston street.

Elwin P. Norberg, architect, has opened an office at 6403 Hollywood blvd., Los Angeles, and desires manufacturers' samples and catalogs.

Henry John Burden and G. Roper Gouinlock have entered into partnership for the practice of architecture under the name of Burden & Gouinlock, with offices at 101 King street, West, Toronto.

A. D. R. Sullivant, formerly associate member of the firm of Hoppin & Koen, and Frederick M. Godwin have formed a partnership for the practice of architecture under the name of Godwin & Sullivant, with offices at 350 Madison avenue, New York.

Do YOUR Plans Specify the Material That Makes Walking Surfaces Safe for the Public?

PLANS for public buildings are not complete unless adequate provision has been made for safe walking surfaces where foot traffic is heavy. A large percentage of schoolhouses, business buildings and public buildings of various kinds now being erected are having installations of ALUNDUM SAFETY TILE wherever the traffic is sufficient to warrant it.

ALUNDUM SAFETY TILE is selected because it combines everlasting durability with slip-proof effectiveness. It never wears smooth whether used as a flooring or as a nose for stairs. The first cost is the only cost. Replacement of stairtreads and other non-slipping materials has been a problem, but there is no such problem when ALUNDUM SAFETY TILE is employed.

Every architect who hasn't a sample should send for one and for further information.

NORTON COMPANY

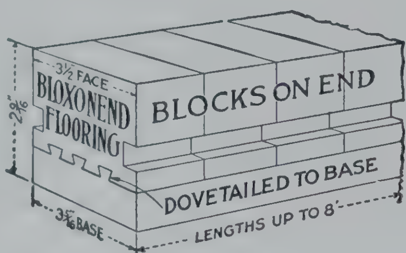
Worcester - - Mass.

New York 151 Chambers St. | Chicago 11 No. Jefferson St. | Detroit 233 W. Congress St.

T-30

TRADE NORTON MARK

"There is nothing perfect, but Blox-on-end is the nearest to a perfect heavy service floor"



Comes in sections averaging 7½ feet in length

¶ The above is not a coined phrase but a positive statement made by a member of a very old and conservative firm of architects located at Cincinnati.

¶ That numerous other architects and engineers have the same opinion of Blox-on-end is evidenced by the fact that it is being specified extensively for the country's leading industrial plants — for plants whose owners are convinced that Blox-on-end's initial cost is justified by ultimate economy and continuing satisfaction.

¶ Blox-on-end (not a loose block floor) is in a class by itself. Scientifically designed for heavy service, no expense is spared to make it what it is — the best utility floor on the market, and this company stands behind it in every way.

¶ If you are interested in only the best, write nearest office for Booklet "B" and specifications.

Carter Bloxonend Flooring Co.

1303 R. A. Long Building, Kansas City, Mo.

Chicago: 332 South Michigan Avenue **New York: 501 Astor Trust Building**

Cleveland: 1900 Euclid Avenue **Boston: 914 Broad Exchange**

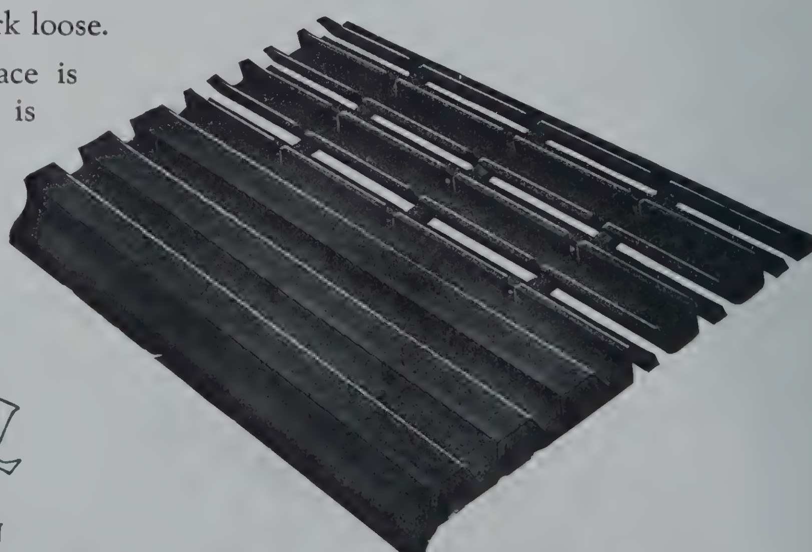
A Surface of Lead Through the Life of the Tread

IN Universal Safety Treads the non-slip lead inserts are rolled in the base-plate and interlocked at the bottom in such a manner that they can never work loose.

Thus a safe, non-slip lead surface is always present until the tread is completely worn out.

They are easily installed and adaptable to any construction — iron, wood, stone or concrete.

Our book on Universal Safety Treads gives information of value to every architect. — Write for a copy



UNIVERSAL CO

SAFETY TREAD

40 COURT ST. BOSTON

NOTE THE LEAD CLEAR THROUGH THE TREAD.

Index to Advertising Announcements


The ELJER SIXTEEN
THESE few fixtures have been selected from our very complete line as being the best of their respective types. This assortment will answer almost any staple requirement.
We are leaders in our line, make only the highest quality of vitreous china and fully guarantee each piece.
Send for catalog
"The Standardized Sixteen"
illustrating and describing these fixtures
ELJER COMPANY
Factories
FORD CITY, PENNA. and CAMERON, W. VA.
ELJER CO.
FORD CITY, PENNA.
LYNDON—15x18 slab, 10x15 basin
TATLER—17x21½—12x16 basin
STAFFORD
SHASTA SANUS (With Lip)
MARION—SANUS
HOLLAND—MAXIMUS

THIS REGISTERED TRADE-MARK IS INDELIBLY STAMPED IN THE END OF EVERY BOARD OF TRUE "TIDEWATER" CYPRESS. LOOK FOR IT.

CYPRESS "The Wood Eternal"

is accounted conspicuously fine for the inside trim of the house, especially for the kitchen. It is not "put on the warp" by steam and other forms of moisture, such as too often infest the kitchen. Then the grain is handsome and it takes a most beautiful finish. Why should not kitchens be attractive? Would it not help solve the servant problem? Cypress lasts and lasts and lasts and lasts—and always "behaves."

Let our "ARCHITECTS' DEPARTMENT" help YOU. Our entire resources are at your service with reliable counsel.

We invite correspondence
with a serious purpose in it.

Southern Cypress Manufacturers' Association

1234 Poydras Building, New Orleans, La., or 1234 Graham Building, Jacksonville, Fla.

SPECIFY AND INSIST ON "TIDEWATER" CYPRESS.
IDENTIFIED BY THE CYPRESS ASSN.'S REGISTERED TRADE-MARK.
IF IN ANY DOUBT, PLEASE WRITE US IMMEDIATELY.

THIS REGISTERED TRADE-MARK IS INDELIBLY STAMPED IN THE END OF EVERY BOARD OF TRUE "TIDEWATER" CYPRESS. TAKE NO OTHER

THE BARTA PRESS, CAMBRIDGE